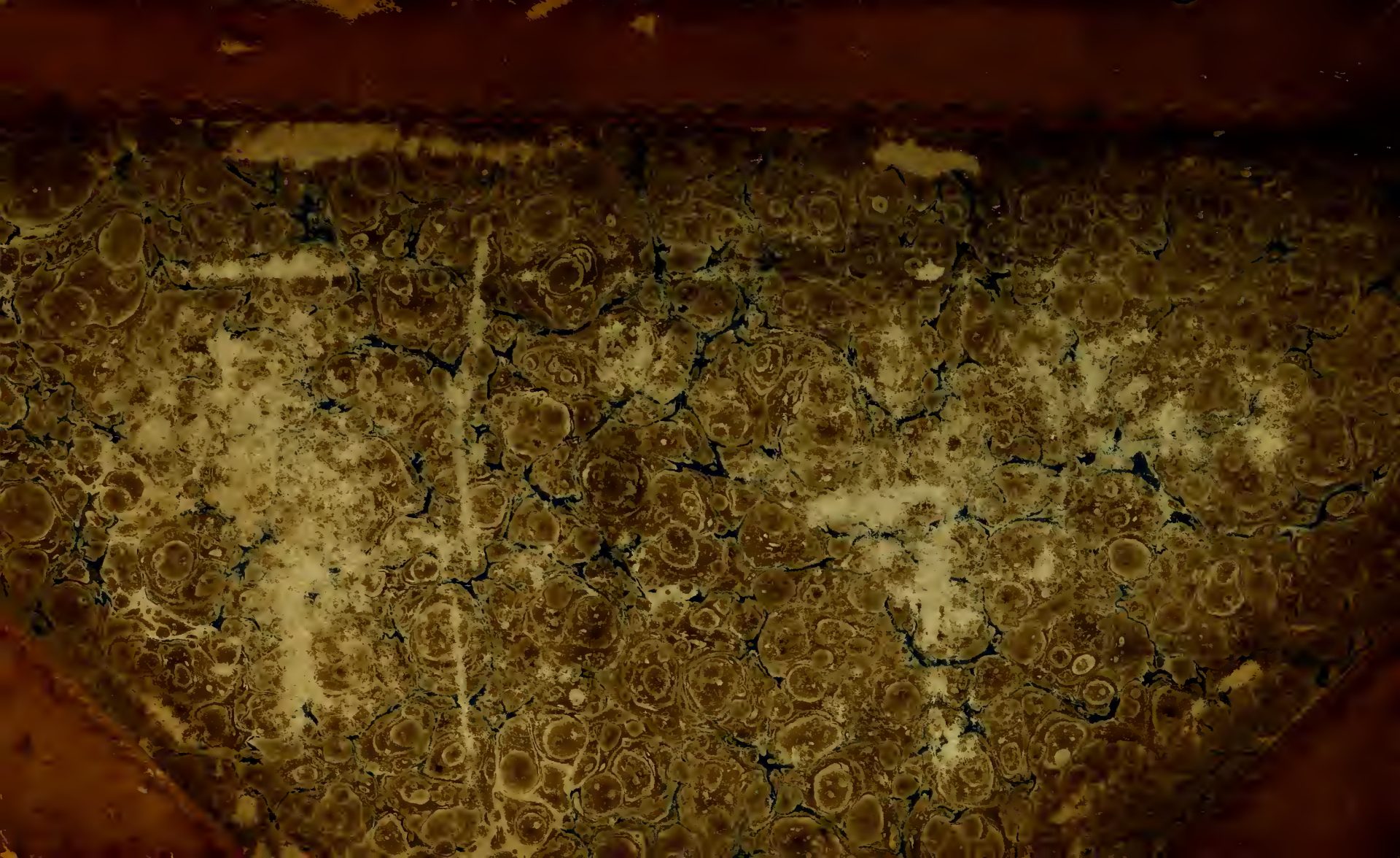

THE

MENTAL CALCULATOR;

BEING

A COMPENDIUM

OF CONCISE YET GENERAL RULES

FOR

THE READY SOLUTION

OF VARIOUS USEFUL AND INTERESTING PROBLEMS

IN ASTRONOMY,

WITH EXPLANATORY ILLUSTRATIONS,

Forming an Epitome of the Elements of that Science.

TO WHICH IS ADDED,

A Guide to the Constellations.

BY P. LOVEKIN.

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PREFACE.

THE use of the following Rules for the purpose of facilitating a ready and immediate solution of such Problems to which they apply, without the necessity of writing figures, too frequently occurs to require any comment or eulogium on their utility.

This little Work, being more particularly designed for the use of Schools, the Rules are so arranged as to be easily committed to memory, and for that purpose, and to render it more generally in-

telligible, abstruse terms are as much as possible avoided.

The various revolutions of the heavenly bodies, being the standard measure of time, a knowledge of the Use of the Globes has become a necessary branch of a liberal education; and hence to know how to solve the usual Problems by mental calculation, must necessarily be a desirable acquisition.

It may perhaps be remarked, in some few instances, that the solutions resulting from these rules will not stand the test of more elaborate calculations, but they will in general be as accurate as those found by the Globes; and in the general concerns of life, it appears of very little importance should these solutions vary a

few minutes from the time found by more exact calculations.

It is neither intended or presumed that this Work should supersede the necessity of having recourse to those scientific and excellent Treatises on the Globes already in the hands of the Public, of whose utility none can be more sensible than the Author of this Work, who, however, hopes with the utmost deference, he may at least claim the merit of an humble assistant.

To Teachers and Learners of the Use of the Globes, the following Rules will it is apprehended, be found of essential utility, by them the former will be able to correct the exercises of the latter, without the trouble of always referring to the

Globe, and the latter to compare and prove their more scientific operations ere they submit them to the inspection of the teachers.

To solve a very considerable number of problems on the Globes by the usual methods, recourse must be had to an Ephemeris for a given year: which may not always be at hand, but by the rules here laid down, it will be manifest that in numerous instances the necessity of referring to an Ephemeris will be obviated.

It frequently occurs that Students who have made considerable progress on the Globes, find it difficult to distinguish the various Constellations in the Heavens; to such the Guide annexed, at the end of

this Work, by way of appendix, will be found essentially useful in rendering their appearance familiar.

KENSINGTON GRAVEL PITS,
DEC. 1, 1820.

EXPLANATION

OF THE SIGNS USED IN THE FOLLOWING WORK.

Two parallel lines....	=	Equality.
Saint George's Cross..	+	Plus, more, or addition.
A straight line.....	—	Minus, less, or subtraction.
Saint Andrew's Cross..	×	Multiplication
A line between 2 points	÷	Division.
Numbers placed in a fraction-like manner	$\frac{476}{32}$	The lower being the Divisor, the upper the Dividend.

2 : 4 : : 8 : 16, Proportioned one to the other; as 2 are to 4 so are 8 to 16.

ERRATA.

p. 71, last line but one, dele "quently."
p. 78, 11th line, for "Georgius," read "Georgium."
p. 81, 6th line from bottom, for "Dracois," read "Draco is."
p. 94, 5th line from bottom, for "most," read "more."
p. 95, 9th line, for 2, read 2°.

THE

MENTAL CALCULATOR.

PROPERTIES OF THE CIRCLE.

60 Seconds make 1 Minute.
60 Minutes .. 1 Degree.
30 Degrees .. 1 Sign.
12 Signs .. 1 Circle.

Seconds are marked thus ″
Minutes ..... ′
Degrees ..... °
Signs ..... ^{s}

EXAMPLE I.

Let it be required to subtract 2^{s} 4° 24′ from 4_{s} 10° 48′.

4^{s}	10°	48′
2	4	24
2	6	24

EXAMPLE II.

Let it be required to subtract 7^s 10° 4′ 40″ from 12 Signs?

12^s				
7^s	10°	4′	40″	
4	19	55	20	

To find whether any given Year is Leap Year, or not.

RULE.

Divide the given year by 4, if nothing remain, it is Leap Year; but if 1, 2, or 3 remain, it shows the number of years after Leap Year. This Rule may be committed to memory in the following lines:—

Divide by 4: what's left shall be,
For Leap Year, 0: past, 1, 2, 3.

EXAMPLE I.

Was the Year 1819 Leap Year?

Rejecting the centuries, 19 divided by 4, and 3 remain; therefore, the Year 1819 was the third year after Leap Year.

EXAMPLE II.

How is the Year 1820 to be reckoned?

4)20

5 0 remains, therefore the Year 1820 is Leap Year.

Required, how the following years will be reckoned, 1830, 1841, and 1848?

OBSERVATION.

Philosophers in earlier ages have been greatly embarrassed to determine the exact length of the year with precision and accuracy. The most natural division of the year appeared to the Egyptians, according to Herodotus, to be the returns of the New Moon. And as they observed 12 New Moons to happen within the time of the general return of the seasons; they therefore first divided the year into twelve equal parts, which they called months, and as they reckoned about thirty returns of morning and evening between the times of the New Moon; therefore, they reckoned their month to consist of 30 days, and their year of 12

months, 12 times 30, or 360 days; and this is what is generally understood by the lunar year of the ancients.

But in process of time it was found that this year did not agree with the course of the Sun, the seasons gradually falling later in the year than they had been formerly observed to do; this obliged them to correct their method of calculating their year, which they did from time to time, by taking a day or two from the month as often as they found it too long for the course of the Moon, and by adding a month called an intercalary month, as often as they found the 12 lunar months to be too short for the return of the four seasons, and fruits of the earth; this kind of year so corrected, is that which is understood by the luni-solar year of the ancients.

A great variety of methods were resorted to by different nations to correct the length of the year. The Egyptian Trismegistus added five days to the above reckoning; and Thales is said to have done the same among the Greeks; but the Jews, Syrians, Ethiopians, Romans, Per-

sians, and Arabs, had all years of different periods. At length Julius Cæsar observing the confusion occasioned by this variety of reckoning, about 45 years before the birth of Christ (it being then computed that nearly 90 days had been lost by the former method of reckoning), directed that these should be taken into the account; and the first Julian year was made to consist of 444 days, called Annus Confusionis, the Year of Confusion, and that afterwards every fourth year should consist of 366 days; the other three years of 365 days each, thereby compensating for the odd six hours omitted in each of the three preceding years. This odd day was introduced into their calendar every fourth year, by reckoning the 24th of February twice; and as this day, in the old account was the same as the 6th of the calends of March, which had been long celebrated on account of the expulsion of Tarquin, it was called BisSextus Calendas Martii, from which we have derived our Bissextile or Leap Year. This is what is to be understood by the Julian account, or Old

Style, which continued to be used in most Christian countries until the year 1582.

Astronomers, since the time of Julius Cæsar, have found that the true length of the common solar year, that is the time the Sun takes to move from one of the solstitial points to the same again, is 365 days, 5 hours, 48 minutes, 51½ seconds, being less than the Julian by 11 minutes, 8½ seconds, which is about the 130th part of 86,400, the seconds contained in a day; so that in 130 Julian years there would be one day gained, and consequently in 47,450 years, the beginning of the year would have advanced forwards through all the seasons.

In the year 325, when the Council of Nice settled the day for the celebration of Easter, the Vernal Equinox, that is, the day in the Spring when the Sun crosses the Equator, happened on the 21st of March, but about the year 1580, the Vernal Equinox fell on the 11th of March, making a difference of about ten days, the necessity of some alteration was manifest. Gregory XIII. who was Pope at

that time, observing that this difference of time in the falling out of the Equinox would affect the intention of the Nicene Council concerning the time of the year appointed by them for the celebration of Easter, published a Bull in the year 1581, ordering, that in the next year, the 5th of October should be reckoned the 15th, and so on; thus the 10 days taken off would cause the time of the Vernal Equinox to fall on March 21, as at the time of the Nicene Council; and because a little more than three days had been gained in every 400 years, by the Julian account, in order to prevent any future difference, every centesimal year, not divisible by 4, as 1700, 1800, 1900, &c.* should contain only 365 days, which, by the Julian account, should have contained 366 days; and the centuries divisible by 4, as 1600, 2000, 2400, &c.† should be Leap Years of 366 days; and thus the 3 days would be omitted,

* 17, 18, 19, if divided by 4, 1, 2, 3, will remain.

† And 16, 20, 24, if divided by 4, there will be no remainder.

which the anticipation of the Equinoxes would gain in 400 years; the small excess of 2 hours and 40 minutes in 400 years, not amounting to a whole day in less than 3600 years, being rejected as inconsiderable, the intermediate years to be reckoned as they used to be in the Julian or Old Style. This is what is to be understood by the Gregorian or New Style, which was received in most of the Christian states, but in consequence of the dissent in religious tenets, the English were unwilling to adopt any alteration emanating from the Romish Church. At length, after repeated applications to Parliament, by some of the most intelligent men in the country, the Calendar was reformed by Act of Parliament, in the year 1752, and a New Style, nearly corresponding with the Gregorian, was then adopted, and is the style now in use; but as 170 years had elapsed since the Gregorian alteration, the Old Style had consequently gained above a day more upon the course of the Sun than it had at that time, it was therefore enacted, that instead of cancelling 10 days, as had been done by the Pope,

11 days should be left out of the month of September; and accordingly, on the 2d day of that month the Old Style ceased, and the next day, instead of being the 3d, was denominated the 14th.

The time of the commencement of the year has been variously determined. The Chaldeans and Egyptians commenced their year from the Autumnal Equinox. The Jews begin their ecclesiastical year from the New Moon, whose full happens next after the Vernal Equinox. In England the year began on the 25th of March, till the commencement of the New Style.

To find the Lunar Cycle, or Golden Number.

RULE.

Add 1 to the date of the year, divide by 19, the remainder is the number required; if no remainder, the Golden Number is 19.

EXAMPLE.

What is the Golden Number for the year 1820?

1820+1÷19, leaves a remainder of 16, which is the year of the Lunar Cycle or Golden Number.

ILLUSTRATION.

The Moon's orbit crosses the ecliptic in two places; these points of intersection are called the Moon's nodes. Suppose the Moon's nodes to be in any particular place in the ecliptic at any given time, they will not be in the same situation again for a period of nearly 19 years. The Christian era commenced with the 2nd year of the Lunar Cycle, hence the rule will be obvious.

As it will be necessary to enter more fully into an explanation of the Moon's nodes in the theory of eclipses, the student is referred to the observations under that head.

To find the Epact.

RULE.

Subtract 1 from the Golden Number, multiply the remainder by 11, divide the product

by 30 (if above that number) the remainder is the Epact sought.

EXAMPLE.

What is the Epact for the year 1820?

The Golden number by the preceding rule being 16, then, $16 - 1 \times 11 \div 30$ leaves a remainder of 15, the Epact for 1820.

As the two last rules may be difficult to solve by mental calculation, the following method appears preferable.

To find the Epact for any subsequent year, the Epact for a particular year being given.

RULE.

Add 11 for every subsequent year to the given Epact? 30 (if above that number) being rejected, the remainder will be the Epact required.

EXAMPLE I.

The Epact for the year 1819 was 4? hence $4+11=15$; which is the Epact for the year 1820.

EXAMPLE II.

$15 + 11 = 26$; the Epact for the year 1821.

EPAMPLE III.

$26 + 11 - 30 = 7$; the Epact for the year 1822.

Required, the Epacts for the following years, 1823, 1824, 1826, and 1828?

The pupils should commit to memory the Epact and other useful notes at the commencement of each year, to save the trouble of calculation, which nevertheless it is necessary to know how to perform.

ILLUSTRATION.

The Epact is the difference between the Solar and Lunar year, or, which is the same, the Moon's age at the end of the year. This will be rendered plain by considering that the time of one lunation is $29\frac{1}{2}$ days, which multiplied by 12 gives 354, the number of days in the Lunar year, then, this subtracted from 365, the number of days in the Solar year, leaves 11. Suppose therefore that at any particular time

the new Moon should happen on the 1st of January, the Epact for that year would then be nothing, at the beginning of the second year the Epact or Moon's age would be 11; at the beginning of the third year 22, and at the beginning of the fourth year 33; but as the time of one lunation is never more than 29½ days, the Epact cannot possibly exceed 30, in this case therefore 30 must be subtracted; so that instead of 33 at the beginning of the 4th year, the Epact would be only 3. By observing this rule through a period of 19 years, the Epacts will stand in the following order, 0, 11, 22, 3, 14, 25, 6, 17, 28, 9, 20, 1, 12, 23, 4, 15, 26, 7, 18; so that the Epact expresses the number of days from the last new Moon in the old year to the 1st of January in the new.

Of Monthly Epacts.

It will be necessary that the student commit to memory the number corresponding to each month, which, in the years, when divided by 4, a remainder will be left, that is, in common years, and will stand thus:

Jan.	Feb.	March.	April.	May.	June.
0.	2.	0.	2.	2.	4.
July.	Aug.	Sept.	Oct.	Nov.	Dec.
4.	6.	7.	8.	9.	10.

But in those years divisible by 4, without a remainder, or in Leap Years, 1 must be added to each month after February, and will then stand thus :

Jan.	Feb.	March.	April.	May.	June.
0.	2.	1.	3.	3.	5.
July.	Aug.	Sept.	Oct.	Nov.	Dec.
5.	7.	8.	9.	10.	11.

ILLUSTRATION.

When the Epact is 0; that is, when the New Moon happens on the 1st of January, then the Solar and Lunar Years begin together, in which case the Moon's age at the beginning of each month is called the Monthly Epact. This is found by dividing the number of days between the 1st of January and the 1st of the given month by $29\frac{1}{2}$, the remainder is the Epact for that month.

To find the Moon's Age on any given day.

RULE.

Add together the day of the month, the Epact for the given year, and the number corresponding to the given month, their amount, rejecting 30, when it exceeds that number, will be the Moon's age required.

EXAMPLE I.

Required, the Moon's age on July the 1st, 1820?

By the preceding rules the Epact is 15, the corresponding number (being a Leap Year), is 5, and the day of the month 1, then $15+5+1=21$, therefore the Moon's age was 21 days on July the 1st, 1820.

EXAMPLE II.

Required, the same for November the 9th, 1820?

$15+9+10-30=4$, the Moon's age on Nov. the 9th, 1820.

EXAMPLE III.

Required, the same for Christmas Day, 1822?

The Epact for the present year (say 1819) is 4, the given year being 3 years distant, say, 3 times 11 are 33, add the present Epact 4, equals 37, reject the 30, leaves 7, which is the Epact for the given year; then,
$7+25+11-30=13$; therefore, the Moon will be 13 days old on Christmas Day, 1822.

Required, the Moon's age on the following days?

March the 20th, June the 21st, September the 23d, and December the 22d, in 1820 and following year.

Should the student be at a loss to determine the number corresponding to the month, March may be called the 1st, April the 2d, and so on, adding 1 to each month in Leap Years, continuing the Epact for the preceding year till March, which will vary but little from exactitude.

To find the time when the Moon comes to the meridian, i. e. when south of any place.

RULE.

Multiply the Moon's age by 4, divide the product by 5, the quotient will be the hour

and fractional parts of an hour expressed in 5ths of 12 minutes each.

EXAMPLE I.

Required, the time the Moon was on the meridian of London on the 24th of March, 1820?

By the preceding rule the Moon was 10 days old, then $10 \times 4 \div 5 = 8$; therefore the Moon was on the meridian at 8 o'clock on the day in question.

EXAMPLE II.

Required, the same for July the 1st, 1820?

By the rule as before, the Moon was 21 days old, then $21 \times 4 \div 5 = 16$, and 4 over; therefore, the Moon was on the meridian at 16 hours $\frac{4}{5}$, that is 48 minutes past 4 on the following morning.

NOTE.

The day is here supposed, according to the method of astronomers to begin at noon, or 12 hours later than the civil day of the

same denomination, and to be counted up to 24 hours, or the succeeding noon, when the next day begins. Thus the day of the month and the hour of the day are the same in this method as in the civil account at noon, and from noon till midnight; but from midnight till noon they differ; for whereas in the civil account, a fresh day is supposed to begin at midnight, and the hours to begin over again, in this method the day is still continued beyond midnight, and the reckoning of the hour is continued up to 24. Thus, the distances put down in the above for July the 1st, 16 hours 48 minutes, belong to July the 2d, 48 minutes past 4 in the morning by civil reckoning. An easier method of solution may be applied, viz. count the number of the days the Moon has passed the full, or 15 days old, and proceed as before; thus in the above example, the Moon being 21 days old, say, $21 - 15 = 6 \times 4 \div 5 = 4$, and 4 over; this gives the hours after midnight, viz. 48 minutes past 4 on the following morning.

Required, the time of the Moon's passage

over the meridian of London on the following days, viz. on your own birth-day and the King's birth-day in the present and ensuing year?

ILLUSTRATION.

The theory of the Moon being intricate, and her motions in her orbit irregular, it is impossible to reduce them to a general rule: however, in the above a mean is taken, and the principles on which it is founded will be obvious when it is considered that the Moon moves through her orbit in the course of a lunar month; her mean motion therefore in 24 hours is 13° 10′ 14″ 6‴, and as the Sun moves through 360°in 365 days,5 hours,48′,52″, the mean motion of the Sun in the same time is 59′ 8″; the Moon's motion, therefore, is 12° 11′ 6″ swifter than the apparent motion of the Sun in 1 day, which, converted into time at the rate of 4 minutes to a degree, amounts to 48 minutes, 44 seconds of time. This may be rendered still more familiar by considering that at the time of New Moon the Sun and

Moon are in conjunction. If the time of their conjunction should take place exactly at 12 o'clock at noon, they would both be on the meridian together; then as the Moon's diurnal motion exceeds the Sun's by about 12°, the next day when the Sun is on the meridian, the Moon will be about 12° distant, that is, she will come to the meridian about 48 minutes after the Sun. On the second day she would be 24° distant, or be on the meridian 1 hour 36 minutes after the Sun; and so on for about 15 days, when she would be about 180° distant; so that when the Sun would be setting the Moon would be rising.

To find the time of High Water at London Bridge, or any other place.

RULE.

Four times the Moon's age if by 5 you divide,
Gives the hour of her southing, add 2 for the tide.

EXAMPLE I.

Required, the time of high water at London Bridge, on March the 24th, 1820?

By a preceding rule the Moon was 10 days old, then, $10 \times 4 = 40 \div 5 + 2 = 10$, therefore it was high water at London Bridge at 10 o'clock on the given day.

EXAMPLE II.

Required, the time of high water at the same place July 13, 1820?

Epact 15, day of the month 13, the number corresponding to the month 5, then,

$15 + 13 + 5 - 30 = 3$ the moon's age; then

$\frac{3 \times 4}{5} = 2$ hours 24 minutes for the southing, add 2 for the tide; therefore it was high water at 24 minutes past 4.

Required, the time of high water at London Bridge on the following days:

May the 1st, November the 9th, and December the 25th, in the present and ensuing year.

The time of high water at any other place than at London may be found by the same rule, if instead of adding 2 as given in the rule for London, there be substituted the time of high water at the given place on the day of

full or change of the Moon to be found in the table at the end of this work.

EXAMPLE.

Required, the time of high water at Cromer, August the 21st, 1820?

The Moon will be 13 days old by the rule, then, $\frac{13 \times 4}{5} = 10$ hours 24 minutes the Moon's southing; then add 7, the time of high water on the days of the full and change, therefore it will be high water at 24 minutes past 5 o'clock at the given place.

Required, the time of high water at Bristol and Harwich on September the 3d, 1821?

What time will it be high water at Gravesend to-day?

ILLUSTRATION.

The Tides are occasioned by the Moon's attraction. When the Moon is in the zenith or nadir of any place, the waters of that place become elevated; this attractive power must however be exerted some time before the

greatest elevation will occur, it is therefore found to be about two hours after the Moon has passed the meridian that the greatest elevation takes place. The Sun is found also to attract the waters, but his distance from the earth is so great, that his attractive force is less than that of the Moon, therefore, at the time of New Moon, the Sun and Moon being in conjunction, their attractive forces act conjointly on the waters, and produce what are called Spring Tides; but when the Moon comes to her first and last quarters, while her attraction tends to elevate the waters beneath her, the Sun's attraction tends to elevate the waters beneath him at another part of the earth's surface, and draws off the waters, so that those beneath the Moon become less elevated, and produce what are called Neap Tides.

As the Moon comes to the meridian about 48 minutes later every day, it occasions a similar interval between each tide; but it has been found that whether the Moon be on the meridian or in the nadir of any place, the effect is the same; this occasions two tides in that time,

that is at an interval of about 12 hours 24 minutes. This understood, will enable the student to determine which way the stream runs at any given hour.

EXAMPLE.

What time will it be high water at London Bridge, June 15, 1820; and which way will the water be running at 4 o'clock on that day? Epact 15, day of the month 15, and the corresponding number 5, then $15+15+5-30=5$ the Moon's age, then $5 \times 4 \div 5=4+2=6$, therefore it will be high water at 6 o'clock in the afternoon on the given day: then, as the tide will be running up towards London Bridge 6 hours 12 minutes previous to the time of high water, after which it will flow regularly back for the same time, it is evident that the stream will be running up westerly, or towards London Bridge, at the given hour.

EXAMPLE II.

Required, whether a boat going from London to Westminster Bridge, on August the 11th,

1820, at 12 o'clock, and returning at 2 in the afternoon, will go and return with or against the tide?

By the former rules the Moon will be 3 days old, and it will be high water about 24 minutes past 4; then, as the tide will run up for 6 hours 24 minutes previous to the time of high water, when it turns and goes regularly back for the same time, it is evident that the boat will go with the tide and return against it.

Required, whether a boat going from London to Westminster Bridge at 12 o'clock and returning at 3 in the afternoon, November the 9th, 1820, will go and return with or against the tide?

Intending to go from Blackfriars to Vauxhall by water at 8 o'clock in the evening of August 16, 1820, and return at 2 o'clock the following morning, it is required to ascertain whether the boat will go and return with or against the tide?

Which way will the tide be running at London Bridge at 2 o'clock on the 27th of March, 1821?

Which way was the tide running at London Bridge on the 2d of January, 1819?

A vessel is expected off London Bridge during the morning of the 15th of October in the present year; and as it will probably take her 5 or 6 hours to drift up with the tide, it is required to ascertain about what time she may be expected?

To find the time of Sun-rise and set at London on any given day.

The Sun crosses the Equator twice in every year, viz. on 21st March and 23d September: these times are called the Vernal and Autumnal Equinoxes, equal days and nights, that is, the sun rises and sets at 6 o'clock, the sun also arrives at his greatest northern declination June 21, and his greatest southern declination December 21, which are called the summer and winter solstices.

RULE.

If the given day be between the Vernal and Autumnal Equinoxes, find the number of weeks that day is after the Vernal Equinox till

the Summer solstice; but if after the Summer solstice, find the number of weeks previous to the Autumnal Equinox, in either case the Sun will set $\frac{1}{5}$ of an hour, or 12 minutes for every week after 6 o'clock.

If the given day be between the Autumnal and Vernal Equinoxes, find the number of weeks that day is after the Autumnal Equinox till the winter solstice; but if the given day be after the winter solstice, find the number of weeks previous to the Vernal Equinox: in either of these cases the Sun will set $\frac{1}{5}$ of an hour for every week, before 6 o'clock: the time of Sun-setting subtracted from 12, the remainder shows the time of Sun-rising, or what amounts to the same, as many hours and minutes as the sun sets after 6, so many hours and minutes he will rise before 6 on the same day; and *vice versa*, so many hours and minutes as the Sun shall set before 6, so many hours and minutes he will rise after 6 on the same day.

NOTE.

The Sun rises and sets with scarcely any difference of time for several days, at the times

of the solstices, therefore the number of days that may exceed 11 weeks and a half, or 12 weeks, must be rejected. At the summer solstice the Sun sets at about 17 minutes past 8; at the winter about 52 minutes past 3.

EXAMPLE I.

At what time does the sun set at London on the 30th of May?

Say, days in March after the Equinox 10, April 30, and May 30. Being 70 days, or 10 Weeks after the Vernal Equinox, the Sun sets $\frac{1}{5}^{0}$ of an hour, or 2 hours after 6, that is 8 o'clock.

EXAMPLE II.

Required, the time of Sun-set at London on July the 20?

From July the 20th, to September the 23d (the Autumnal Equinox), are 65 days, or 9 weeks and 2 days, say, 9 weeks and a half, or 1 hour 54 minutes, therefore the sun sets 1 hour 54 minutes after 6, that is, at 54 minutes past 7 o'clock.

EXAMPLE III.

Required, the time of Sun-set and rise at London on the 14th of October?

This being 3 weeks after the Autumnal Equinox, the Sun will set $\frac{3}{5}$ of an hour before 6, that is, 24 minutes past 5: this subtracted from 12 hours, leaves 6 hours 36 minutes; therefore, the sun rises at 36 minutes past 6.

EXAMPLE IV.

Required, the time of Sun-rise and set at London on January the 31st, also the length of the day and night?

From January 31, to March 21, (the Vernal Equinox), are 49 days, or 7 weeks, therefore the Sun sets $\frac{1}{5}$ of an hour before 6, that is 36 minutes past 4; then, if the number of hours and minutes at which the sun sets before 6 be added to 6, it will show the hour of rising, therefore, the Sun rises at 24 minutes past 7; then double the time of Sun-setting (which in this Example is 9 hours 12 minutes), will show the length of the day, which, subtracted from

24 (the number of hours in a day), leaves 14 hours, 48 minutes, the length of the night.

Required, the time of Sun-rise and set, length of day and night for the present and following days, November the 9th, January the 5th, October the 9th, and April the 24th ?

The above rule may be made applicable to any other latitude than that of London, by taking the time the Sun sets after 6 o'clock on the longest day at the given place, and dividing this time by 12, and applying the quotient instead of the $\frac{1}{5}$ of an hour, or 12 minutes given in the above rule.

To find nearly the Sun's Longitude, that is, his place in the Ecliptic.

RULE.

Count the number of days the given time is from the time of the Vernal or Autumnal Equinox, and the Sun will be as many degrees as days from the first point of Aries, or the same of Libra, subtracting 1 degree in every 60, half a degree in 30 ; and a quarter of a degree in 15.

EXAMPLE I.

Required, the Sun's longitude, for April the 30th, 1824?

From March 20, (being Leap Year) to April 30, are 41 days; therefore the Sun's longitude will be 41°, less $\frac{3}{4}$ of a degree, that is 1^s 10° 25′, or 10° 25′ in Taurus.

EXAMPLE II.

Required the same for May the 30th, in a common year?

Seventy days from the Vernal Equinox, therefore, the Sun's longitude is 69°, that is 2^s 9° (rather less), or 9° in Gemini.

EXAMPLE III.

Required the same, for October the 10th?

Being 17 days from the Autumnal Equinox, therefore the Sun's longitude will be 16° 45′ in Libra.

EXAMPLE IV.

Required the same, for November the 5th?

Distance from Equinox, 43 days; 45′ being

subtracted, the Sun's longitude is therefore 1^s 12° 45′ from the 1st degree of Libra, that is, 12° 45′ in Sagittarius.

Required, the Sun's place in the Ecliptic on the following days: January the 4th, February the 9th, April the 27th, June the 4th, August the 7th, October the 10th, and December the 25th?

ILLUSTRATION.

The principles on which this rule is founded will be obvious, when it is considered that the earth completes her course round the sun in $365\frac{1}{4}$ days nearly; and as the Ecliptic, or the Earth's path, consists of 360 degrees, then by the Rule of three,

$365\frac{1}{4}$ D : 360° : : 1 D : 59′ 8″ 2, the portion of the Ecliptic at a mean rate, which the Earth moves through in a day, or when speaking from the appearance, the mean motion of the Sun in the same time.

To find the time of the Moon's rising.

RULE.

From the New to the Full Moon; add together the times of the Moon's southing and

Sun-rise, the amount will be the time of the Moon's rising in the forenoon ; but if it exceeds 12, subtract that number, the remainder will be the time in the afternoon. But if the Moon be past the full, calculate her southing by the number of days she has past the full, which added to the time of Sun setting, will also show the time of her rising; when the time exceeds 12, it will happen on the following morning.

EXAMPLE I.

Required, the time of the Moon's rising at London, May the 17th, 1820 ?

By the preceding rules the Moon's age will be 5, hence south at 4, and the Sun's rising 4 hours 20 minutes, then, $4+4^{hrs.}20'=8^{hrs.}\ 20'$, therefore the Moon will rise at 20 minutes past 8 o'clock.

EXAMPLE II.

Required, the time of the Moon's rising at London, March the 30th, 1820 ?

The Moon will be 16 days old, that is 1 day past the full, this gives for her southing 48 minutes, the given day being about $1\frac{1}{2}$ week

from the Equinox, the sun sets at about 18 minutes past 6, then, $6^{hrs.}\ 18' + 48' = 7^{hrs.}\ 6'$, therefore the Moon will rise at 6 minutes past 7 o'clock, that is, as she is 1 day past the full, she rises about 48 minutes after Sun-set.

To find the time of the Moon's setting.

RULE.

From the new to the full Moon, add together the times of the Moon's southing and Sun's setting, the sum will be the time of the Moon's setting; but if the Moon be past the full, add together the times of the Moon's southing and Sun's rising, the sum will then give the time of the Moon's setting.

EXAMPLE I.

Required, the time of the Moon's setting at London, May the 20th, 1820?

By the former rules the Moon's age will be 8, hence her southing 24 minutes past 6, the given time being nearly 9 weeks after the Vernal Equinox, say Sun sets $1^{hr.}\ 48'$ past 6, then, $7^{hrs.}\ 48' + 6^{hrs.}\ 24' = 14^{hrs.}\ 12'$; therefore

the Moon will set at 12 minutes past 2, on the following morning.

Required, the time of the Moon's setting on the following days? September the 3d, October the 10th, and November the 9th, 1820?

Required the time of her rising on the following days? June the 30th, August the the 30th, and September the 19th, 1820?

Repeat the same questions for an ensuing year.

NOTE.

It is customary in our common Almanacks, to give the Moon's setting from the change to the full, and her rising from the full to the change. As the principal use of the above rule is to ascertain Moonlight nights, the student had better use the same method of solution.

ILLUSTRATION.

The Moon at the time of change, or new Moon, being in conjunction with the Sun, that is, in the same sign and degree of that sign, they must rise together, and set nearly so. Again

when the Moon is at the full, that is in opposition to the Sun, by being 6 signs distant, when the Sun sets, the Moon will rise, and at Sun-rise, the Moon will set; these remarks however, will only be strictly applicable at those times when the Sun and Moon are in conjunction and opposition exactly at these times of rising and setting, which is seldom the case, the Moon's motion exceeding the Sun's by about 12° in 24 hours, or about half a degree an hour. Should therefore the Sun and Moon be in conjunction or opposition 2 hours before, or after Sun-rise or set, then at these times the Moon would be 1 degree distant from the Sun, and would rise or set with a difference of 4 minutes of time; if the difference of time should be 4 hours, the rising and setting difference would be 8 minutes, and so on.

It will be necessary to remind the student that three or four days before or after the change, the dark side of the Moon being turned towards the earth, she disappears, and it is then said, there is no Moon.

To find the Moon's Longitude, or place in the Ecliptic.

RULE.

Multiply the Moon's age by 12°* the quotient will give her distance from the Sun, which added to the Sun's longitude, gives that of the Moon.

EXAMPLE I.

Required, the longitude of the Moon for the 17th of March, 1820?

15+1+17—30=3, the Moon's age: then, 12°×3=36°, therefore the Moon will be 1 sign 6° distant from the Sun. The given time being 3 days previous to the Vernal Equinox, the Sun will want 3° of the 1st point of Aries, therefore the Moon's longitude will be about 1 sign 3°, that is 3° in Taurus.

EXAMPLE II.

Required, the same, on May the 20th, 1820?

* If the Moon's daily motion be considered 12°11'6" the calculation will be more accurate.

By the preceding rules the Moon's age will be 8 days, and the Sun's longitude 60°, that is 2 signs; then $12° \times 8° = 96°$; therefore the Moon will be 3 signs 6° distant from the Sun, the Moon's longitude will be 5 signs 6°, that is, 6° in Virgo.

EXAMPLE III.

Required the same, for September the 8th, 1821?

Epact 26,+day of the month 8,+corresponding Num. $7 = 41 - 30 = 11$; therefore the Moon will be 11 days old, then, $12° \times 11 = 132°$, the Moon's distance from the Sun, that is, 4 signs 12°. The given time being 15 days before the Autumnal Equinox, the Sun's longitude will be 5 signs, 15°, then,
$5^s\ 15° + 4\ 1\ 2° = 9^s\ 27°$; therefore the Moon will be 27° in Capricorn.

EXAMPLE IV.

Required, what place in the Ecliptic the Moon will be in on the 23d of February, 1830?

The Epact for the present year (1819) is 4, the given year is 11 years distant: then,

$11 \times 11 + 4 = 125$, rejecting the 30_s leaves 5, which is the Epact for 1830; then day of month $23 + 5$ (Epact) $+ 2$ (corresponding number) $= 30$, the Moon's age; therefore the Sun and Moon will be in conjunction: that is, the Sun's longitude will be the Moon's also; then, as the given time is 26 days previous to the Vernal Equinox, the Sun's longitude will be 11 signs 4° nearly; therefore the Moon's longitude on the given day will be 4° in Pisces.

Required, the Moon's longitude on the following days? January the 9th, March the 11th, and June the 21st, in the present and following year? February the 10th, 1823? June the 26th, 1824? and February the 12th, 1850?

To find the time of the rising and setting of the Moon by another method.

RULE.

Find the Moon's place in the Ecliptic by the preceding rule; then the time of Sun-setting, on the day in the year when he is in the same place in the Ecliptic, will be the Moon's half

continuance above the horizon, which being added to the Moon's southing, gives the time of her setting, but subtracted therefrom, gives the time of her rising.

EXAMPLE I.

Required, the time of the Moon's rising and setting, July the 15th, 1820?

By the preceding rules the Moon will be south at 4 o'clock, and her place in the Ecliptic about 24° 30′ in Virgo. The Sun is in the same place about 6 days before the Autumnal Equinox, and sets about 12 minutes past 6, which being added to 4 (the Moon's southing), gives for the Moon's setting, 12 minutes past 10, but subtracted from 4 (increased by 12 hours when necessary), gives 48 minutes past 9 o'clock, the time of her rising.

EXAMPLE II.

Required the time of the Moon's rising and setting, March the 22d, 1820?

Moon's southing is 24 minutes past 6, her longitude is about 3 signs 8_o, and the Sun is in the same place a little after the Summer solstice.

Moon's southing $6^{hrs.}\ 24, + 8^{hrs.}\ 15'$ (Sun's-setting) $= 14^{hrs.}\ 39'$; therefore the Moon sets at 39 minutes past 2 on the following morning, the 23d; then*, $6^{hrs.}\ 24' - 8^{hrs.}\ 15' = 10^{hrs.}\ 9'$; and rises at 9 minutes past 10 in the morning, March the 22d.

The time found by this as well as the former rule to solve this problem may differ from that given in the almanacks, the motion of the Moon being so rapid and irregular that to determine her true place even by the most accurate calculations is involved in very great difficulty; therefore it is not possible to determine by a mental solution, the precise time of her rising or setting; add to this, the Moon's orbit being elevated and depressed above and below the plane of the Ecliptic, in an angle of about 5 degrees and a third, so that the Moon may have between 28 and 29 degrees declination; the Sun's greatest declination being $23\frac{1}{2}$ degrees nearly. The Moon may therefore make a greater or less angle with the horizon, as her declination is north or south.

* Increased by 12 hours when necessary.

When the Moon is north of the Ecliptic, she rises sooner and sets later than when in the Ecliptic, and when she is south of it, she rises later and sets sooner.

When the student becomes acquainted with the method of allowing for the increase of the Moon's motion to the given hour of her rising or setting, also of allowing for the declination north or south, it will not be difficult to determine in the mind, very nearly the time of her rising or setting sufficiently accurate to determine whether the nights will be moonlight or dark.

To find the Dominical Letter.

RULE.

To the given year add its fourth part, omitting fractions, divide the sum by 7. If nothing remain, A is the Dominical or Sunday Letter, if 1 remain, G, &c. according to the following Table.

B.	C.	D.	E.	F.	G.	A.
6.	5.	4.	3.	2.	1.	0.

EXAMPLE.

Required, the Dominical Letter for the year 1818?

$1818+\frac{1818}{4}=2272$, this, divided by 7, leaves 4, the Dominical Letter over 4 is D, the letter required. As this method may be found to employ too many figures to be entered into in the mind, the following is preferable as a mental rule.

RULE.

Reject the centuries in the given year, to the remaining years add their 4th part, omitting fractions, increase the sum by 2, and divide the whole by 7, the remainder being subtracted from 7 will be the number corresponding to the letter required, considering them in the following order:

1.	2.	3.	4.	5.	6.	7.
A.	B.	C.	D.	E.	F.	G.

EXAMPLE I.

Required, the Dominical Letter for the year 1819?

Cutting off the two left hand figures, say, $19+\frac{19}{4}=23+2=25$, which, divided by 7, leaves 4, and this subtracted from 7 leaves 3; therefore, the letter required will be the 3d letter in the alphabet, C.

EXAMPLE II.

Required, the Dominical Letter for the year 1820?

Rejecting the centuries, say, 20 and its 4th part added, increased by 2, equals 27: this divided by 7, remain 6, then 6 subtracted from 7, remains 1; therefore the first letter of the alphabet is the letter required.

NOTE.

The year 1820 divides even by 4, hence it is Leap Year: in these years there are two Dominical Letters, one is used till the end of February, and the other till the end of the year. The above rule always gives the letter answering to the months after February. The Dominical Letter for the year 1819, C, and

for 1820, A, the intervening letter, B, will be the Dominical Letter till the end of February; therefore the letters for the year 1820 will be B and A. This will be apparent when it is considered that another day is added to February in Leap Years.

The Dominical Letter for 1821 will be G.

Required, the Dominical Letters for the years 1823, 1824, 1829, 1830, and 1841.

ILLUSTRATION.

It has been the custom from the time of the primitive Christians to denote the days in the week by the first seven letters of the alphabet, the same letter answering to the same day of the week in any year, and the first letter of the alphabet to the first day of the year. One of these letters must therefore denote all the Sundays throughout the year, and is hence called the Dominical Letter. If Sunday be the first day of the year, A is the Dominical Letter; if the year begin on Saturday, B is the Dominical Letter, &c.

To find the Day of the Week answering to any given Day of the Month, and conversely.

The letters corresponding to the first days of the twelve months stand in the following order:

A.	D.	D.	G.	B.	E.
Jan.	Feb.	March.	April.	May.	June.
G.	C.	F.	A.	D.	F.
July.	Aug.	Sept.	Oct.	Nov.	Dec.

The order of these letters may however be better retained by committing the following words to memory, and be it observed that each of the initial letters of these words will be the letter corresponding to the first day of each month.

At	*Dover*	*Dwell*	*George*	*Brown*	*Esquire,*
Jan.	Feb.	March.	April.	May.	June.
Good	*Charles*	*Finch*	*And*	*David*	*Frier*
July.	August.	Sept.	Oct.	Nov.	Dec.

RULE.

Find the Dominical or Sunday Letter for the given year by the preceding rule, also the

letter corresponding to the 1st day of the given month; then, as the 1st, 8th, 15th, 22d, and 29th, are on the same day of the week, the distance of the given day from the Dominical Letter will show the day of the week required.

EXAMPLE I.

On what day of the week will the 1st day of December, 1820, fall?

The Sunday Letter for 1820, is A, and the letter corresponding to the 1st of December is F, as in the word Frier in the above twelve words; then say, Sunday A, Monday B, Tuesday C, Wednesday D, Thursday E, and Friday F; therefore the given day of the month will fall on a Friday.

EXAMPLE II.

What day of the Week will November the 9th, 1820, fall on?

The Sunday Letter is A, and the letter corresponding to the 1st of the month is D, as in the word David, in the same twelve words;

therefore the 1st of November will fall on Wednesday, and of course the 8th will be Wednesday, hence the 9th will be on Thursday.

EXAMPLE III.

Required, the day of the week September the 29th, 1821, will fall on?

The Sunday Letter is G, and the letter corresponding to the 1st of the month is F, the initial of the word Finch; therefore the 1st will be on Saturday, the 8th, 15th, 22d, and of course the given day, the 29th, will also be on a Saturday.

Required, the days of the week on which the following days of the month will fall?

January the 30th, May the 29th, December the 25th, in the present year; March the 17th, October the 31st, and November the 9th, in the ensuing year.

A circumstance took place on Sunday, the 5th of January; but it is not recollected whether the year was 1816 or 1817; required in which it happened.

Required, whether Christmas day was on Wednesday or Thursday, in the year 1817?

Required, whether the 11th or 12th of March, 1795, was on Thursday.

To find what day of the month Easter Sunday will fall on in any given year.

RULE.

Find on what day of the month and day of the week the first Full Moon will take place after the Vernal Equinox: that is, March the 20th in Leap Years, and 21st in common years, then Easter Sunday will be the Sunday next following.

EXAMPLE I.

Required, the day of the month Easter Sunday will fall on, in the year 1820?

By the preceding rules the Moon will be at the full on the 29th of March, and the Dominical Letter will be A. The letter corresponding to the 1st of March is D; therefore the 1st and 29th will fall on Wednesday, and the following Sunday will be Easter Sunday, which of course will happen on the 2d of April, in the given year.

EXAMPLE II.

Required, the day of the month Easter Sunday happened on in the year 1819?

The Moon's age at the Vernal Equinox was 25; hence at the full on the 9th of April. The Dominical Letter was C, and the letter corresponding to the 1st of April being G; therefore, the 1st of April was on Thursday, hence the 9th was on Friday, and Easter Sunday was on the 11th.

Required, the day of the month on which Easter Sunday will be celebrated in the following years, 1824, 1826, and 1830?

OBSERVATION.

The earliest day on which Easter Sunday can possibly happen is the 22d of March, and the latest the 25th of April. By Act of Parliament, Easter Day is the first Sunday after the Full Moon which happens upon or next after the 21st of March; and if the Full Moon fall On a Sunday, Easter Day is the Sunday after. However, in the year 1818, the Full Moon took place on the 22d of March at 2 o'clock in the

afternoon, yet Easter Sunday was celebrated on that day, which is apparently contrary to the Act of Parliament, the author noticed this seeming error through the medium of the press during the preceding years; and the elucidation he obtained, was, "That the Act of Parliament does not refer to the astronomical Full Moon as determined by *exact* calculation, but to the Full Moon, as determined by *the established Calendar.*" Thus, in the year 1818, the *Astronomical* Full Moon was on Sunday, the 22d of March; but the Full Moon, according to *the established Calendar,* was on Saturday the 21st, consequently, Easter Day was the Sunday following, viz. the 22d.

To find the Moveable Feasts in the year, all which depend on Easter.

Septuagesima Sunday ...	is 9 Weeks	Before Easter.
Sexagesima Sunday	8 Weeks	
Shrove, or Quinquagesima Sunday	7 Weeks	
Shrove Tuesday and Ash Wednesday follow Quinquagesima Sunday.		

Quadragesima Sunday..	is	6 Weeks	Before Easter.
Palm Sunday		1 Week	
Good Friday.....		2 Days	
Low Sunday	is	1 Week	After Easter.
Rogation Sunday.....		5 Weeks	
Ascension Day, or Holy Thursday, the Thursday following Rogation Sunday.			
Whit Sunday.....		7 Weeks	
Trinity Sunday		8 Weeks	

Then follow all the Sundays after Trinity in order. The Sundays between Ash Wednesday and Easter Day are called Sundays in Lent, and the Sundays between Easter Day and Whit Sunday are called Sundays after Easter.

The first Sunday in Advent is the nearest Sunday to St. Andrew's Day (November 30), before or after; and when that day falls on Sunday, it is Advent Sunday.

LAW TERMS.

HILARY Term begins January the 23d, and ends February the 12th, unless either day fall on Sunday, when it begins and ends the day after: continues 21 or 22 days.

Easter Term begins invariably on the Wednesday fortnight after Easter Sunday, and ends the Monday three weeks following: continues 27 days.

Trinity Term begins invariably on the Friday fortnight after the end of Easter Term (being the Friday next after Trinity Sunday), and ends on the Wednesday fortnight after, unless that day happen on the 24th of June, when it ends on the 25th: continues 20 or 21 days.

Michaelmas Term begins the 6th and ends the 28th of November, unless either happen on Sunday, then the day after.

To find when the Sun and Moon will be likely to be eclipsed.

The Orbit of the Moon crosses that of the Earth in two places, these points of intersection are called the Moon's Nodes, which are continually varying, moving by a retrograde motion through the whole circle, or 360°, in about 19 years, or rather 18 years 228 days 9 hours: that is, their motion is not direct or progressive, as from Aries to Taurus, but retrograde, as from Aries to Pisces.

The motion of the Moon's Nodes is irregular; but by comparing together a great number of distant observations, the mean annual retrograde motion is found to be about 19° 19′ 44″, and about 1° 36′ a month. Astronomers have calculated, that if the Moon be less than 17° 21′ from either Node at the time of New Moon, the Sun may be eclipsed; or if less than 11° 34′ from either Node at the Full Moon, the Moon may be eclipsed.

These elucidations well understood will convey to the student a clear comprehension of the theory of Eclipses.

RULE.

The Moon's Nodes will be in the Equinoctial points (that is, the first degree of Aries and Libra), on the 1st of May, 1820, then for every year after that time subtract from $12^s\ 19^o\ 19'$; and for every month, $1^o\ 36'$ (or dinarily $1\frac{1}{2}$ degree), the remainder will show nearly the place of the Moon's Nodes. If the given time be previous to May the 1st, 1820, add the same to the 1st degree of Aries, then find when the Sun will be in or near the Moon's Nodes; and at the nearest New or Full Moon which may happen at those times there is likely to be an eclipse. If the Moon be within about 17^o of either Node at the time of the New Moon, the Sun may be eclipsed, but if about 12^o at the time of Full Moon, the Moon may be eclipsed.

EXAMPLE I.

Required, at what time of the year 1820, the Sun and Moon will be likely to be eclipsed?

The Sun will be at the place of the Moon's Nodes about March and September: that is,

in Aries and Libra, then by the preceding rules, there will be a New Moon on the 14th and a Full Moon on the 29th of March, and a New Moon on the 7th, and a Full Moon on the 23d of September.

On March the 14th, being about 6 days to the Equinox, the Sun's Longitude will be 24° in Pisces, and the Moon's Node (being about a month and a half previous to May the 1st), will be about 2° 30′ in Aries; hence, it is obvious that the Moon will come to a change at a distance of about 8° or 9° from the Node, therefore there will be an eclipse of the Sun on that day. On the 29th of March (being 9 days from the Equinox), the Sun will be between 8° or 9° in Aries, the Moon's Nodes (being about a month previous to May the 1st), will be about 1° 30′ in Aries; hence the Moon will come to the full at about 10° of her Node, and of course there will be an eclipse of the Moon on that day.

On the 7th of September (being 15 days previous to the Equinox) the Sun's longitude will be 15° in Virgo; and (being rather more than 4 months from May the 1st), the place of the

Moon's Node will be 23° 45′ in Pisces; that is, 12 signs — 6° 15′, leaves for 1 Node 11^s 23° 45′, or 5^s 23° 45′, for the other Node, that is, 23° 45′ in Virgo. The Sun being at this time about 15° in the same sign, the Moon will come to the conjunction or change about 8° of her Node, consequently there will be an eclipse of the Sun at that time.

On the 22d of September the Moon will come to the full, and being nearly 5 months from May the 1st, the place of her Node will be about $7\frac{1}{2}^{\circ}$ from the Equinoctial point, consequently the Sun will be there at that time; hence, there must be an Eclipse of the Moon.

EXAMPLE II.

On March the 4th, 1821, there will be an Eclipse of the Sun, this being about 10 months distant from May the 1st, 1820, equals a subtraction for the Moon's Node of about 16°, that is, $12^s - 16^{\circ} = 11^s\ 14^{\circ}$. The Sun's place at that time will be about $15\frac{1}{2}^{\circ}$ from the Equinoctial point also in the same sign; therefore there will be an Eclipse of the Sun. But on the

19th of the same month the Moon will be at the full; the Sun at that time will be within a degree of the Equator, and the Moon's Nodes will be about 17° from the Equinoctial points, therefore there can be no eclipse, as the Moon must come to the full within 11° 34′ of her Nodes to cause an Eclipse of the Moon, and 17° to occasion an Eclipse of the Sun.

EXAMPLE III.

Required, at what times in the year 1823 the Sun and Moon will be likely to be eclipsed?

From May the 1st, 1820, to the beginning of the year 1823, will be about 32 months; the shifting of the Moon's Nodes in that time, by the preceding rules, will be equal to about 1^s 21° 30′, which subtracted from 12 signs, leaves about $8\frac{1}{2}^{\circ}$ in Aquarius for one Node, and 6 signs distant for the other Node; the Sun will be there about January and July; therefore the Full Moon in January will suffer an eclipse; and at the New Moon in February the Sun will be eclipsed. At the New Moon in July the Sun will be again eclipsed. And

the Full Moon in the same month will be eclipsed. The rest is left for the exercise of the Student.

Required the times when Eclipses will happen in the years 1822, 1824, and 1825.

NOTE.

Other and more general rules would have been given to find the place of the Moon's Nodes, but as they could not have been entered into in the mind, they would not be suited to a work almost entirely designed for facilitating Mental Calculations.

ILLUSTRATION.

The average number of Eclipses in a year is four, two of the Sun and two of the Moon; and as the Sun and Moon are as long above the horizon of any particular place as they are below it, the average number of visible Eclipses in a year is two, one of the Sun and one of the Moon; the Solar and Lunar Eclipses always quently happen about a fortnight before or after each other.

Although the most general number of Eclipses in any year is only four, yet there are sometimes six, but there cannot be more than seven nor fewer than two. This will be apparent when it is considered that the Sun cannot pass both the Nodes of the orbit of the Moon oftener than once a year, this would occasion four Eclipses in a year; but should the Sun pass one of the Moon's Nodes in the beginning of the year, he may pass the same Node again previous to the end of it, the Sun being about 173 days in passing from one Node to the other, which is 6 signs distant, it will appear plain that he may return to the same Node in about 346 days; then as there are 365 days in the year, in this case there would be 6 Eclipses. Then as the time of every Lunation consists of 29 days, 12 hours, 48 minutes, 3 seconds; 12 times this equals 354 days, 8 hours, 48 minutes, 36 seconds. Should there be an eclipse in the beginning of the year, a New Moon in this case may happen before the year is terminated, which on account of the retrograde motion of the Moon's Nodes, may fall within the Solar

limit, and occasion seven Eclipses in the year, five of the Sun and two of the Moon.

When the Moon changes in either Node, she cannot be near enough to the other Node at the time of the next Full Moon to be eclipsed; and in 6 Lunar months afterwards, that is, in about 177 days, she will change near the other Node; in this case there cannot be more than two Eclipses in a year, and both of the Sun.

As the limits of the ecliptic of the Sun are 17°, 21′, and those of the Moon 11°, 34′, it is obvious that the Sun's limits are greater than those of the Moon, and it follows that there must be more Solar than Lunar Eclipses, in the ratio of about 3 to 2. Eclipses of the Sun are always confined to particular places, but those of the Moon are visible at all places on the Earth where the Moon is above the horizon at the time the Eclipse happens; hence there is a greater probability of a Lunar Eclipse being visible than a Solar one.

The preceding methods of solution will be found the most generally useful; and such familiar rules have, it is presumed, been ap-

plied, that a ready answer by them may be given mentally to any of the preceding problems; a few, however, are added, which, though intimately connected with them, yet are not upon the whole so generally necessary, but as they are sometimes to be met with the usual methods of solution are given without applying in a manner strictly mental.

To find the Cycle of the Sun.

RULE.

Add 9 to the given year, and divide the sum by 28, the remainder is the year of the Solar Cycle; if there be no remainder the Solar Cycle is 28.

EXAMPLE.

What is the year of the Solar Cycle for the year 1820?

$1820+9\div28$ leaves a remainder of 9, which is the solar Cycle required.

Required, the same for the years 1822, 1840, and 1856?

OBSERVATION.

The Cycle of the Sun is a period of 28 years, after which the days of the month return to the same days of the week, the Sun's place to the same signs and degrees of the Ecliptic on the same months and days; 9 years of this Cycle are considered as having passed at the birth of Christ; hence the rule. The Cycle has no immediate reference to the apparent motion of the Sun, it is principally made use of in finding the Dominical Letter from the following table.

1	E	D	5	G	F	9	B	A	13	D	C	17	E	F	21	A	G	25	C	B
2		C	6		E	10		G	14		B	18		D	22		F	26		A
3		B	7		D	11		F	15		A	19		C	23		E	27		G
4		A	8		C	12		E	16		G	20		B	24		D	28		F

To find the Cycle of Roman Indiction.

RULE.

Add 3 to the date of the given year, and divide the product by 15, what remains is the Cycle required.

EXAMPLE.

For the year 1820.

1820+3÷15, leaves a remainder of 8, the number of the Cycle required.

OBSERVATION.

The Cycle of Roman Indiction is a circle of 15 years, used by the Romans for denoting the periods of the payment of taxes imposed on the countries they had conquered; it was first established in the year 312. The Popes date the acts of their several reigns by it. If 312 be subtracted from the given year, and the remainder divided by 15, what remains will give a result the same as the preceding rule.

EXAMPLE.

For the year 1820.

1820 — 312 = 1508, which divided by 15, leaves a remainder of 8.

To find the Julian Period.

Add 4713 to the year of Christ, the amount will be the Julian Period.

EXAMPLE.

Required, the Julian Period for the year 1820?

1820+4713=6533, which is the Julian Period required.

OBSERVATION.

The Julian Period is the product of the Cycles of the Sun, Moon, and Indiction, multiplied into one another, that is,

$28 \times 19 \times 15 = 7980$ years.

The corresponding year of the Julian Period to any given year may be found by multiplying the constant number 4845, by the given year of the Cycle of the Sun, 4200 by that of the Cycle of the Moon, and 6916, by the year of the Cycle of the Indiction, and the total of these 3 products being divided by 7980, the remainder will be the year of the Julian Period.

EXAMPLE.

For the year 1818.

The Solar Cycle, 7; Lunar Cycle, 14; and Indiction, 6.

Constant Number,

For Sun..... = 4845 × 7 = 33915
For Moon.... = 4200 × 14 = 58800
For Indiction = 6916 × 6 = 41496

7980) 134211 (16
127680

6531

therefore, the corresponding year of the Julian Period for the year 1818 was 6531.

The following will serve as exercises :

The Planet Georgius Sidus, was discovered by Dr. Herschel, March the 13th, in the year of our Lord, 1781, and of the Julian Period, 6494 ; the rest is left for the exercise of the student.

The different Cycles are found by the preceding rules.

Sir Isaac Newton died in the year of our Lord, 1727 : required, the corresponding year of the Julian Period ?

A GUIDE

TO

THE CONSTELLATIONS.

The division of the Starry Firmament into Constellations is of the highest antiquity. Bootes and the Bear are spoken of both by Homer and Hesiod: Arcturus, Orion, and the Pleiades, are mentioned in the Book of Job, and there is scarcely any ancient author in whose writings the names of some of the most remarkable ones are not to be found.

As a preliminary it will be proper to remark that Astronomers mark the Stars of every Constellation with a letter of the Greek alphabet, denoting those that are the most conspicuous by (α) alpha, the next by (β) beta, the next by (γ) gamma, then (δ) delta, then (ε) epsilon, then (ξ) zeta, and (η) eta.

The Great Bear is a Constellation which is always visible, it is easily known by the seven

Stars of which it consists ; four of them are in the body and three in the tail, and the two farthest from the tail α and ξ are called the pointers because a line drawn from ξ to α, if produced will pass to the Polar Star, which is about as far from α as α is from η ; the convex side of the tail is turned towards the pole.

Cassiopeia is opposite to the Great Bear, the Polar Star lying between them, so that if a line be drawn from ξ Alioch Ursa Major through the Pole Star, it will pass through the middle of Cassiopeia on the other side of the Pole, this Constellation consists of 6 or 7 Stars which form a γ, or as some describe it, a chair turned on its back, this description is by no means distinct, but there is little probability of mistake, several of them being of the second magnitude.

The Little Bear is nearly of the same form as the Great Bear, but the figures though parallel are reversed with respect to one another.

The Pole Star is of the 3d magnitude at the extremity of the tail, the 4 next Stars to it are only of the 4th magnitude, but the two last

which make up the square are of the third, and are called the guards. These last are in a line drawn through the centre of the Great Bear, perpendicular to its longest side.

Arcturus, a Star of the first magnitude in Bootes, is 31° distant from the tail of the Great Bear, and if a line be drawn through ε and η the two Stars at the extremity of the tail, it will point to Arcturus.

When the Great Bear is on the meridian, Lyra, and Capella, two Stars of the first magnitude are seen one in the east, the other in the west, in a line drawn through the Pole Star perpendicular to that which joins the Great Bear and Cassiopeia. Capella is to the east when the Great Bear is under the pole, and if their altitude be the same it is almost equal to that of the Polar Star.

Dracois on the line drawn from α Ursa Major through the Guards of the Little Bear, between which and Lyra may be observed the four Stars in the shape of a lozenge which form the head; the tail lies between the Pole Star and the square or body of the Great Bear. The line drawn

through the Guards points to η, Draconis which is north of β, and south of ε, in the line which is directed towards the Pole of the Ecliptic. This line produced a little farther towards δ and ξ Draconis will pass between α and β Cephie, the line drawn from the Pole Star to these two last mentioned Stars in Cepheus will pass near the tail of the Swan, which is a beautiful object, and never sinks below the horizon of London.

Having now gone through those Constellations which are always above our horizon, we will next proceed to those which are visible in a winter's evening.

About 7 or 8, P. M. in the months of January and February, Orion is visible in the south. It consists of seven Stars, four of which are at considerable distances from each other, and in the centre of these are three others of the second magnitude, which are much closer and in a straight line: this being a very remarkable Constellation may be easily discovered. The three bright Stars in the Belt of Orion, vulgarly called the Three Kings, point on one side to the Pleiades, and on the other to Sirius.

Sirius is the brighest of the Fixed Stars, and is remarkable for its twinkling radiancy and brilliance; it lies on the S. E. of Orion. The Pleiades are on the N. W. of Orion, and form a group of small Stars which may be easily distinguished as they lie a little above the line drawn through the three Stars of the Belt of Orion.

Aldebaran, or the Bull's Eye, is a Star of the first magnitude, very near the Pleiads, and situated between them and γ, the Star in the western shoulder of Orion.

Procyon, or Canis Minor, the Little Dog, is a Star of the first magnitude, situated to the north of Sirius, and the east of Orion; it makes nearly an equilateral triangle with Sirius and the Belt of Orion which is sufficient to distinguish it.

The Twins are two Stars of the second magnitude, situated midway between Orion and the Great Bear. They may also be distinguished by drawing a line from Rigel (which is β, or that of the four outermost Stars in Orion which lies on S. W.) through ξ, the Eastern Star, in

the Belt, since this will direct us to the heads of the Twins; and again if we draw a line from ε Orion to α and β of the Great Bear, it will pass over one of the paws of the Bear, and also by the heads of the Twins; this same line will cross the feet of the Twins, and pass very near α, the Star in the eastern shoulder of Orion; the feet of the Twins are marked by four Stars in a straight line perpendicular to the direction here given.

The line drawn from Rigel, through γ, in the western shoulder of Orion will pass on the north through ξ, a Star of the third magnitude, on the southern horn of Taurus it is about 14_0 from Orion, or the same distance at which γ Orionis is from Rigel: β, the northern horn of the Bull, is also called the foot of Auriga, it is of the 2d magnitude, and in the line drawn from α, in the eastern shoulder of Orion, through ε, Tauri, the southern horn; the Ecliptic passes between the two horns.

The Lion may be recognised by the same Stars α, and β, in the Great Bear, which serve to point out the Polar Star. They are distant

about 45° north of the Lion, which forms a large trapezium, in which there is a Star of the first magnitude called Regulus, or β Cor Leonis, the Lion's Heart, it is on a line drawn from Rigel through Procyon, but at the distance of 37° from the latter, β, also a Star of the 2nd magnitude in the Lion's tail, is a little south of a line drawn from Arcturus to Regulus, it is 24° to the east of Regulus, and makes an equilateral triangle with Spica Virginis and Arcturus.

Cancer is a Constellation of small Stars, which are distinguished with difficulty. The nebulous Star in Cancer is not so easy to be perceived as the Pleiades, it will be found nearly half way between the centre of Gemini and Regulus, or in the line which joins Procyon and the tail of the Great Bear.

From the middle Star in the Belt of Orion proceeds a train or row which forms what is called the Sword, it contains the Nebula. A line drawn through the Sword and the Star in the middle of the Belt points towards ε the southern horn of the Bull, and beyond it to the middle of Auriga.

Auriga, or the Charioteer, forms an irregular Pentagon, the most northern Star of which is Capella, or the Goat; it is of the first magnitude, and may be found by drawing a line through δ and α, the two most northern Stars in the body of the Great Bear.

Aries, the first of the twelve Constellations in the Zodiac, consists principally of two stars of the first magnitude, situated very near each other; β the most Western of the two is accompanied by a smaller star of the 4th magnitude, which has been called the first star in Aries, because it was once the nearest star to the Equinoctial point. This Constellation is in the same line with Aldebaran and Procyon, from the former of which it is distant about 35°,

The Girdle or Belt of Perseus consists of three Stars, one of which is of the second magnitude and passes about 9° from the Zenith of London, they form a curve with its convex side turned towards the Great Bear. It might be sufficient to mention that they lie in the line drawn from the Pole Star to the Pleiades; but

they may also be found by producing a line through Gemini and Capella, this line is directed towards the Girdle of Perseus, the line drawn from the Belt of Orion through Aldebaran, passes through β the head of Medusa, which Perseus holds in his hand, this Star which is called Algol, is changeable.

The Swan is a very remarkable Constellation, it forms a large Cross and contains a Star of the second magnitude. A line drawn from Gemini or the Twins, through the Pole Star, will meet the Swan at about an equal distance, on the opposite: at some seasons of the year they are both at the same time above the horizon. But we shall have another means of distinguishing this Constellation when we are acquainted with that of Pegasus.

The square of Pegasus is found by four Stars of the second magnitude, the most northern is the head of Andromeda; the line drawn from the pointers α and β of the Great Bear through the Pole Star will pass across the middle of these four Stars; a line drawn from the Belt of Orion through Aries will lead to the head

of Andromeda; one drawn from the Pleiades through Aries will lead to γ in the wing of Pegasus or Algenib, the other two Stars are to the west, the northern is β Scheat, and the southern α or Markab. The diagonal drawn through γ and β, passes on the north west towards α in the tail of the Swan, the other diagonal drawn through α and the head of Andromeda, points north east to the Belt of Perseus, having first passed β in the Girdle, and near the foot of Andromeda, these two Stars (β and γ) are of the second magnitude and divide the space between the head of Andromeda and the Belt of Perseus into three equal parts. The line which connects them is at right angles to that which would join Aries and Casiopeia.

The Constellations which are visible during the summer are not to be distinguished with the same facility as those which we have just described; but the student who makes himself acquainted with those stars which are visible in winter, will find that the knowledge of them will assist him considerably in finding the rest.

The middle Star in the tail of the Great Bear is on the meridian over the Pole Star, about 9 o'clock in the latter end of May.

Spica Virginis, a Star of the first magnitude on the meridian, in the south altitude 28½ degrees. The diagonal drawn through α and γ in the Great Bear will nearly pass through this Star, although at the distance of 68°; moreover Spica Virginis makes nearly an equilateral triangle with Arcturus and the Lion's Tail, from which it is distant about 35°. At this time also the four principal Stars in the Crow are a little to the right below Spica. They form a trapezium, and are situated in the same line with Lyra and Spica Virginis.

If from δ and γ the last Stars in the square of Ursa Major, a line be drawn through Regulus, it will meet at the distance of 22° to the south of the star called β or Hydra. The head of Hydra is to the south of Cancer, between Procyon and Regulus; but it is a little south of the line which joins them. This Constellation extends from Canis Minor

to that part of the heavens which is situated below Spica Virginis, and part of Libra.

The Cup is situated between Hydra and Corvus to the west of the latter, the trapezium formed by the four principal stars of the cup is very remarkable.

Lyra is a Star of the first magnitude, and is one of the most brilliant. Its situation with respect to Arcturus and the Pole Star is such as to make nearly a right angled triangle to the east of Lyra.

The Northern Crown is a small Constellation situated between Arcturus and Lyra, it is near Arcturus, and may be easily distinguished by the seven Stars, of which it is composed; they are arranged in a semi-circular form, and one of them (α) is of the second magnitude.

The two last Stars in the tail of the Great Bear are in a line with the Crown.

The Eagle contains a very bright Star of the second magnitude, which is to the south of Lyra and the Swan. It is easily distinguished, because it is situated between β and γ, two stars of the third magnitude, which are

very close, and form a straight line with it. Antares is a small Constellation situated below the Eagle. The Great Circle, which passes through Regulus and Spica Virginis nearly coincides with the Ecliptic, and if it be produced to the eastward it will meet Scorpio, a remarkable Constellation on account of the four Stars in its head, which form a large arch from north to south round Antares, which is placed as a centre to them. One of the four Stars is of the second magnitude, and Antares is a bright star of the first magnitude. Lybra contains two Stars of the second magnitude, which form the two Scales, the line which connects them is nearly perpendicular to that which may be drawn from Arcturus to Antares, and they are a little to the south of the middle of this line of direction. The southern scale is situated between Spica Virginis and Antares; and these three Stars are very near the Ecliptic. Spica Virginis is 21°, and Antares 25° distant from the southern scale.

Sagittarius is a Constellation which follows Scorpio being a little to the east of it. It is in

the line which, passing through Spica Virginus and Antares, follows nearly the direction of the Ecliptic ; it contains several Stars of the third magnitude, which form a large trapezium, two Stars of which, together with two others, form a second trapezium perpendicular to the first. Sagittarius may be known by a line drawn through the middle of the Swan and the Eagle, as it is 35° south of the Eagle or nearly the same distance from it as the Eagle is from the Swan. Sagittarius may also be known by the diagonal line drawn from the head of Andromeda to (α) Pegasi, the line which produced towards the north points out the Belt of Perseus, the line drawn from Antares to the Pole Star passes through Serpentarius and Hercules, it is rather difficult to know these Constellations, therefore we shall describe them in a more particular manner.

The line drawn from Antares passes through the head of Serpentarius, which is not far from that of Hercules, and lies to the south-east of it, they are marked by two Stars of the second magnitude, and the line which connects them

points to the Crown ; it also passes through γ, Hercules, at the distance 13° from the Head of Hercules. β Hercules, is at the distance of 3° to the north-east of γ, the line drawn from it to γ points on the north to ε, Hercules, and the south-west to α, Serpentis, which forms nearly an equilateral triangle with the Head of Hercules and the Crown, the line drawn from the Head of Serpentarius to the Southern Scale of the Balance passes through δ and ε, Serpentarii, two Stars of the third and fourth magnitudes, which are only 1° 20′ distant from each other, and in the line perpendicular to that which was last described ; δ lies to the north-west of ε, and these two Stars point on to the south-east, towards ξ, in the western knee of Serpentarius, which is 7° 30′ from ε. This same direction will lead near to η, the Star in the other knee of Serpentarius, which is about 9° 30′ south-east of ε ; these same Stars, δ and ε, point a little below α, Serpentis ; and if considered as one group they would make nearly an equilateral triangle with (α) Serpentis, and β in the Northern Scale ; 4½°

north-west of α Serpentis, is δ, and 3° south east is ε, of the same Constellation. The direction of these three Stars is also towards ϑ and (ε) Serpentarii, which are 11° from (ε) Serpentis; β and γ, the two Stars in the eastern shoulder of Serpentarius are in the line drawn from the Head of Hercules to the Head of Sagittarius; this line passes a little to the south-east of the Head of Serpentarius; β is 8° and γ 11° from the Head of Serpentarius; a line drawn through them would pass between the two heads of Hercules and Serpentarius. The line connecting these two heads, points to O at the extremity of the tail of the Serpent, which is 22° east of the heart of Serpentarius; this line, drawn from the most eastern Stars of the Crown, which are in the side turned towards Lyra to (α) Serpentis passes by the head of the Serpent between γ and ξ, two Stars of the third magnitude; (β) is the most western of the two. The western foot of Serpentarius lies between Antares, and β, the northern Star in the head of the Scorpion. The eastern leg is between Antares (η) Sagittarii,

which is the highest and most western Star in the Bow.

Capricornus may be found by producing the line drawn from Lyra to the Eagle: this line will pass through α and β, two Stars of the third magnitude in the head of Capricornus: these Stars are 2 from each.

About 20° farther to the east are two other Stars, γ and δ, situated east and west about 2, asunder, they are in the tail of Capricornus.

Fomalhaut is a Star of the first magnitude, and may be found by a line from Aquila to the tail of Capricornus. Fomalhaut lies about 20° to the south-east of δ Capricorni.

The Dolphin is a small Constellation; it consists of a lozenge of four Stars of the third magnitude, and is situated to the east of the Eagle 15°. A line drawn from the Dolphin perpendicularly through the middle of γ, α, and β; the three Stars in the Eagle will pass through o in the extremity of the Serpent's tail.

Aquarius is found by a line drawn from Lyra through the Dolphin, and carried on 30°,

which is as far beyond the Dolphin as the Dolphin is beyond Lyra. Aquarius lies a little to the east of this line. A line drawn from the Dolphin to Fomalhaut will pass entirely across Aquarius, and midway between α and β. These two Stars, the most remarkable of the Constellations, are of the third magnitude, and are about 10° distant; they form the shoulders of Aquarius.

The Whale is a large Constellation, situated on the south of Aries, extending through a space which is equal in length to the distance of the Pleiades from the four Stars in Pegasus.

A line drawn from the girdle of Andromeda, and passing between the two Stars in Aries, will meet (α), a Star in the mouth of the Whale, which is of the third magnitude, and 25° from the horn of Aries; a line drawn from Capella through the Pleiades will pass through (α) Ceti.

A line drawn from Aldebaran through the mouth of the Whale, will pass through β, a Star of the second magnitude in the tail; (β) is 42° degrees west of α, and very near Aquarius

The square in Pegasus alone is sufficient to point out the Whale; for the line drawn through the two most southern of these Stars passes between Aries and the Knot of the Fishes, and will meet the head of the Whale; and the line drawn through the most eastern Star in the same square, points to the tail. Between the head and the tail are situated γ and δ, and between δ and the tail is (o), a changeable Star, which is sometimes of the second magnitude and sometimes quite invisible, δ lies about half way between α and ω.

The Fishes, which form the 12th sign of the Zodiac, are not very remarkable. One of them lies on the South side of the square of Pegasus, under α and γ, the other is on the east of the square, and between the heads of Andromeda and the Whale.

The Star (α) in the Knot of the string which joins the Fishes, is of the third magnitude, and is the most remarkable star in the Constellation; it is situated in the line which joins the head of Andromeda, and (α) the

changeable Star in the Whale; it is also in the line drawn from the feet of the Twins through Aldebaran, and produced towards the West. This Star (α Piscium) is 40° west of Aldebaran, and makes a triangle with (α) Ceti, and (or γ), Arietis, which is right angled at the Star in the Fishes.

We have now given an account of the principal Constellations, from which the rest may easily be known with the assistance of a globe. But it may be necessary to add some directions for finding the Pole of the Ecliptic, which is one of the most remarkable points in the heavens, and one with which a person should be particularly acquainted who wishes to become familiar with the heavenly bodies. It is situated in the Constellation Draco in the same line with γ and δ, and the two Stars in the Great Bear nearest to the tail, it makes almost an equilateral triangle with Lyra and Arided; it is also in the line drawn from a point half way between the two eastern stars in the square of the Great Bear, and produced through the middle of the Guards of the Little Bear, 3°

beyond (α) Draconis; it may easily be known since it is nearly in the same line with the three Stars of the same Constellation marked Θ η and ξ, which are situated in the line drawn from Arcturus to Sepheus and Casseopeia, that passes betwen δ and ξ, Draconis, on the opposite side of the Pole of the Ecliptic, δ and ξ, are near to each other, and in a direction parallel to the tail of the Little Bear, so as to point to the head of Draco. The middle Star (η) is that towards which the Guards of the Little Bear point. Lastly, the Pole of the Ecliptic makes a right angled, and isoceles triangle with the Pole Star and (β) Ursæ Minoris, which is the most northern of the Guards, the right angle is at β. The distances of some of the most remarkable Stars will give the student a better idea of the magnitude of degrees, and are therefore added.

	Deg.	Min.
Arcturus to η Ursæ Majoris	30	29
The 2 outermost Stars in the Belt of Orion	2	44
The 2 Stars in the Shoulders of Orion .	7	30

		Deg.	Min.
Capella	to Castor	30	
Aldebaran	to Sirius	46	
	to Capella	30	45
	to the West Shoulder of Orion	15	47
Sirius	to Rigel	33	40
Procyon	to Regulus	37	20
	to Rigel	38	27
Regulus	to Spica Virginis	54	2
Arcturus	to Spica Virginis	32	2
	to Regulus	59	49
Spica Virginis	to Antares	45	52
Antares	to Arcturus	56	4
	to Aquila	60	
Lyra	to Spica Virginis	87	46
	to Aquila	34	9
	to the Tail of the Swan	23	52
The Tail of the Lion	to Spica	35	2

A TABLE

Of the Right Ascension, half continuance above the Horizon, and rising Point of the Compass of the principal fixed Stars.

	Right ascension.	Half continuance above the Horizon.	Rising Point of the Compass.
	° ′	hrs. min.	
Pegasi—Algenib.....	1 0	7 12	
Cassiopeiæ—Schedar.	7 0		
Ursæ Minoris—Abruccabah	14 0		
Andromedæ—Mirach. .. .	0 0	10 7	N.E. by N.½E.
Arietis	30 0	8 9	N. E. ½ E.
Ceti—Menkar	43 0	6 20	E. by N. ½ E.
Persei—Algol	48 0	8 6	
Pleiadum—Alcyoni	54 0	8 0	N. E.
Tauri—Aldebaran.....	66 0	7 28	N.E. by E. ½ E.
Aurigæ—Capella.....	76 0		
Orionis—Rigel.....	76 0	5 20	E.S. by E. ¾ E.
Canis Majoris—Sirius	99 0	4 36	S.E. by E. ¾ E.
Geminorum—Castor.....	111 0	9 38	N. N. E. ¾ E.
Canis Minoris—Procyon ..	112 0	6 30	E. by N.
Geminorum—Pollux.....	113 0	9 0	N.E. by N.½ E.
Hydra—Alphard	140 0	5 26	E. by S.
Ursæ Majoris—Dubhe	163 0		
Virginis—Spica Virginis ..	190 0	5 10	E. S. E. ½ E.
Leonis—Regulus	150 0	7 10	E. N. E.

	Right ascension.	Half continuance above the Horizon.	Rising Point of the Compass.
	° ′	hrs. min.	
γ Bootes—Arcturus	212 0	7 55	N. E. by E.
α Libræ—Zubenesch	220 0	4 44	E. S. E.
α Coronæ Borealis—Alphacca	232 0	8 45	N.E. by N. ½ E.
α Serpentis—Antares	244 0	3 34	S. E.
α Hercules—Ras Algethi....	256 0	7 20	N.E. by E. ¾ E.
α Ophinchi—Ras Alkague ..	261 0	7 10	
γ Draconis—Ras-taben	268 0		
α Lyræ—Vega	278 0		
α Aquilæ—Altair	295 0	6 47	E. N. E. ¾ E.
β Cygni—Deneb	309 0		
Cephei—Alderaimini.....	318 0		
α Piscis Austrialis—Fomalhaut	342 0	2 52	S. E. by S.
β Pegasi—Markab.....	344 0	7 17	E. N. E.

NOTE.

Such Stars as are not noticed with regard to their half continuance above the Horizon, never set in the latitude of London.

By the above Table the rising culminating and setting of the principal Stars may be determined nearly by a mental calculation.

RULE.

Convert the degrees of the Star's right ascension into time at the rate of 15° to an hour, that will give the time of the Star's culminating on the 20th of March, for any time after; subtract 2 hours for every month, and 4 minutes for every day (increasing the Star's right ascension 24 hours when necessary), which will give the Star's culminating for the given time; or, subtract the Sun's right ascension for the given time from that of the Star, the difference converted into time will give the Stars culminating; then if the half continuance of the Star above the horizon be subtracted from the Star's right ascension, it will give the time of its rising; but added, that of its setting.

NOTE.

Stars which never set at any given place, come to the Meridian under the Pole 12 hours after they have been on the Meridian above it.

EXAMPLE.

Let it be required to ascertain the time when Aldebaran in Taurus will come to the Meridian on the 20th April?

The right ascension of Aldebaran being 66°, which being converted into time, becomes 4 hours, 24 minutes; therefore, that Star will be on the Meridian at that time on the 20th of March, the given time being one month after that time, 2 hours being subtracted, leaves 2 hours 24 minutes, the time the Star passes the Meridian on the 20th of April.

EXAMPLE II.

At what time does Schedar, in Cassiopeia, come to the Meridian on the 1st of April?

The right ascension of Schedar being 7°, which converted into time, gives 28 minutes; therefore, on the 20th of March, it will be on the Meridian at 28 minutes past 12 o'clock, the given time being about one-third of a month after that time requires a subtraction of 40 minutes, leaving 11 hours 48

minutes in the morning for the time of the Star's culminating on the 1st of April.

EXAMPLE III.

Required, the time when Sirius cnlminates and sets on the 20th of March?

The right ascension of Sirius being 99°, in time, gives 6 hours 36 minutes, the time it comes to the Meridian, the half continuance of the Star above the Horizon being 4 hours 36 minutes, being added, gives 11 hours 12 minutes night, the time of its setting; but subtracted=2 hours afternoon; the time of its rising.

EXAMPLE IV.

Required, the time when Sirius will rise, culminate, and set on the 20th of May?

The Sun's longitude being about 60°, or 2^s, on the 20th of May; then 99°—60°=39° which in time is 2 hours 36 minutes, the time of its culminating; then

$2^{hrs.}\ 36' + 4^{hrs.}\ 36' = 7^{hrs.}\ 12'$, the time of its setting; and $2^{hrs.}\ 36' - 4^{hrs.}\ 36' = 10^{hrs.}$, the time of its rising on the 20th of May.

Required, the time when Capella culminates on Christmas day?

At what time does Procyon rise, culminate, and set on the following days? January the 1st, April the 2d, and June the 21st?

A TABLE

Of the Time of High Water at New and Full Moon, at the principal places in the British Islands.

	hrs.	mn.
Aberdeen	0	45
Ayr	10	33
Aldborough	9	40
St. Andrews	2	0
Arran Island	11	0
Bamborough	3	30
Banff	0	0
Beachey Head	10	0
St. Bee's Head	10	45
Belfast	10	0
Bembridge Point	10	15
Berwick	2	30
North Berwick	2	0
St. Bride's Bay	6	0
Bridlington Bay	3	50
Bridport	6	45
Brighton	9	50
Bristol	6	40
Caithness Point	9	0
Cantire Mull	10	30
Cape Clear	4	30
Cork	6	30
Cowes	10	30
Cromartie	11	40
Cromer	7	0
Cullen	0	0
Dartmouth	6	30
Dingle Bay	3	30
Dover	11	30
Dublin	9	15
Dunbar	2	30
Dunbarton	11	15
Dundee		10
Dungarvon	4	30

	hrs.	mn.
Dungeness	9	45
Eddystone	5	30
Edinburgh	2	20
Exeter	10	30
Exmouth Bar	6	20
Falmouth	5	30
Fern Island	3	30
Fifeness	2	0
Flamborough Head	3	40
N. & S. Foreland	10	20
Fortrose	11	40
Founless	6	45
Fowey	5	40
Galway	3	0
Fort George	11	40
Gravesend	1	30
Greenock	11	30
Hartland Point	4	30
Hartle Pool	3	0
Harwich	11	10
Holyhead	9	45
Hull	6	0
Kinsale	5	15
Leith	2	20

	hrs.	mn.
Limerick	4	30
Liverpool	11	15
London	3	0
Milford	5	15
Newcastle	3	15
Orfordness	9	45
Plymouth	6	0
Port Glasgow	11	30
Portland	7	30
Ramsgate	10	30
Rochester	0	45
Sandwich	11	30
Scarborough	3	45
Sligo	5	30
Southampton	0	0
Stockton	3	30
Swansea	6	0
Tynemouth	3	0
Torbay	6	15
Weymouth	7	20
Whitby	3	20
Whitehaven	11	15
Yarmouth	9	0

A MISCELLANEOUS

COLLECTION OF QUESTIONS

Adapted to the preceding Rules.

1. Name all the days of New Moon in the present year?

2. Name all the days of Full Moon in the present year?

3. What sign, and degree of that sign (nearly), will the Moon be in on your next birth-day?

4. Name the Moon's age at the end of every year, for the 10 following years?

5. On what day of the week will New Year's-day fall in the ensuing year?

6. At what time will it be high water at London Bridge, on Christmas day next?

7. Is the present Leap Year, if not, how many years after?

8. At what time will the Sun set and rise on April the 20th, next?

9. At what time will it be high water at Gravesend on the 1st of January, next?

10. Will it be Moon-light at 8 o'clock in the Evening, on the 25th of December next?

11. What is the length of the day, on the 1st of January?

12. What will be the Sun's longitude on May the 20th, next year;

13. On the 9th of November next, the Lord Mayor of London will go in procession by water at 12 o'clock to Westminster Hall to be sworn in, and supposing his return to be at 3 o'clock, whether will he go and return with or against the tide?

14. Name the days in the year 1821, on which there will be Eclipses of the Sun and Moon?

15. What will be the Epact for the next year?

16. How old will the Moon be on the King's birth-day next?

17. At what time will the Moon be over

the Meridian of London, on the 20th of March next?

18. Which way will the water of the River Thames be running under London Bridge on August the 12th, next?

19. On what day of the week will next Christmas Day fall?

20. On what day of the month will next Easter Sunday fall?

21. On what day of the month will the first Friday in March next, fall?

22. A gentleman purposes taking a journey for 7 days, commencing on the 1st of March next, and as he will travel till 10 o'clock each night, it is required, whether he will want his carriage lamps, that is, will, or will it not be Moon-light on each of those nights?

23. Required, whether Sunday was the 31st of July, or the 1st of August in the year 1819?

24. How old will the Moon be on the day of the Vernal Equinox in the ensuing year? On what day of the week and day of the month, will the first Full Moon after that time happen, hence it is required what day of

the month will Easter Sunday fall in the same year?

25. At what time will the Sun rise and set, also what will be the length of the day and night on the Easter Sunday, as determined by the preceding problem?

26. At what time will the Moon rise and set on Easter Sunday in the same year, as in the 2 preceding problems?

27. In the evening of Christmas Day, in the year 1819 the Moon was exactly south, required the hour?

28. Name the months in the year 1821, in which the days of the Moon's age, and the days of the month will be the same?

29. On what days of the week will New Year's Day fall in the years 1822, and 1825?

30. The year, month, and day of the month, on which you were born being known, required on what day of the week was your birth day; the Moon's age on that day; her place in the Ecliptic, and at what time she rose and set?

31. Which way was the stream running below London Bridge at 12 o'clock at noon on

the day you were born, and at what time was it high water at Harwich and Dover on the same day?

32. What is meant by spring tides? Are the tides in the Spring of the year alluded to? Name the time the first spring tide will flow in the next year?

33. On what day of the month will Whitsunday fall in the next year.

34. On March the 29th, 1820, the Moon was eclipsed from about a quarter past 5 until 8 o'clock in the evening; was that eclipse visible at London, that is, was the Moon above the horizon at that time?

35. On what day of the month will Easter Term begin in the year 1822?

36. What will be the Dominical Letter for the year 1838?

37. How much longer is the day on the 5th of May than on the 5th of January?

38. How many hours is the Sun above the horizon at London on Christmas Day?

39. What is the length of the day at London on the 20th of July, and how many degrees

must the Sun's longitude differ to make the day an hour shorter?

40. What day of the year is of the same length as the 4th of June?

41. Whether will the Moon be longer above the horizon on the 1st of April 1821, or on the same day in the year 1822?

42. Find the Epact, Sunday Letter, and Easter Day, for the years 1822, 1825, and 1826?

43. If the Sun set at 24 minutes past 7, at what time does he rise, and what is the length of the day and night?

44. At what time will the Moon rise, culminate, and set at London on Christmas Day next?

45. If the Moon be 5 days old on the 15th of April, what is her longitude?

46. What is the Moon's longitude when Full Moon happens on Christmas Day?

47. How many days difference are there between the Solar and the Lunar years?

48. An eclipse of the Moon will take place on January the 16th, 1824, at about 9 o'clock in

the morning, how many degrees distant will the Moon be from her Node at that time, and will she be above the horizon at the time of the eclipse?

49. Name the place of the Moon's Node for May the 1st, 1839?

50. Name the days on which the Sun will be eclipsed in the year 1839?

51. On what day of the week did the first eclipse of the Sun take place in the year 1820?

52. Intending to travel all night from London, March 24-25th, 1821; will the Moon be above the horizon during that night, if so and a clear night, how many hours will she be visible?

53. Which way was the water running under London Bridge at 12 o'clock at noon, on the 10th of October 1810?

54. A vessel is expected off London Bridge from Greenwich about 2 hours after the turn of the morning tide to-day (as it may occur), about what time may she be expected?

55. A vessel is to drift down the River Thames from below London Bridge with the

evening tide to-morrow, at what o'clock must a person who intends to sail in her be there?

56. The day of the month on which the first Sunday in July 1820, fell, is required?

57. How many eclipses were there in the year 1818, and on what days of the month did they happen?

58. Name the Moon's present place in the ecliptic, also what time the Sun sets when he is in the same place: hence is required the Moon's rising and setting?

59. On September the 29th, 1819, the Moon was exactly south, required at what hour?

60. On the 25th of September, 1819, the Moon was exactly south, required the hour, whether was it day or twilight? If day light, how far distant was the Sun from the western edge of the horizon?

61. At what time does Spica Virginis rise, culminate, and set, on Christmas Day?

62. Required the hour when Capella is on the meridian, on January the 1st.

63. At what time is Dubhe on the meridian over and under the Pole on April the 10th.

64. In the night of December the 25-26th, Dubhe was on the meridian over the Pole, required the hour?

N. B. The Tutor may vary or extend these Questions, according to time, circumstances, and the capacity of the pupils.

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CHEMICAL DECOMPOSITIONS.

ACIDA.

ACIDUM ACETICUM.

Vinegar.

The vinegar being deprived of its colouring matter, or *extractive property*, with a small quantity of *tartar*, &c. is rendered more fit for use.

ACIDUM BENZÖICUM.

Antispasmodic, expectorant, five gr. to fifteen.

Gum Benzöin,—Fresh Lime,—Water,—Muriatic Acid.

Decomposition.—The *benzöic acid* is separated from the gum by the *lime*; the *muriatic acid* being added to this *benzoate of lime*, a soluble *muriate of lime* is formed, and the *benzöic acid* is precipitated.

ACIDUM CITRICUM.

Antiseptic, refrigerant, five gr. to half a dr.

Juice of Lemons,—Prepared Chalk,—Diluted Sulphuric Acid.

Decomposition.—The *Carbonic acid* * of the *chalk* passes off, and its other constituent, *lime*, forms with the *lemon juice* an *insoluble citrate of lime.* The *sulphuric acid* being added, unites with the *lime*, forming an *insoluble sulphate of lime*, which remains on the filtering paper, and the *citric acid* is left dissolved.

ACIDUM MURIATICUM †.

Antiseptic, tonic, five drops to twenty.

Dried Muriate of Soda (*common salt*),—Sulphuric Acid,—Distilled Water.

Decomposition.—The *sulphuric acid* forms with the *soda* a *supersulphate of soda*, and the *muriatic acid* thus at liberty is distilled over in the form of gas, and absorbed by the water placed in the receiver for that purpose.

---

* Carbonic acid is a compound of *oxygen* and *carbon.*

† *Hydrogen* and *chlorine.*

ACIDUM NITRICUM * DILUTUM.

Antisyphilitic, antiseptic, five drops to thirty.

Dried Nitrate of Potass (*Saltpetre*),—Sulphuric Acid.

Decomposition.—The *sulphuric acid* forms with the *potass* a *super-sulphate of potass*, and the *nitric acid* is distilled over.

ACIDUM SULPHURICUM DILUTUM.

Tonic, antiseptic, astringent, five drops to thirty.

Sulphuric acid is composed of *sulphur* and *oxygen.*

Sulphur*ic* acid is a stronger acid than the sulphur*ous* acid, owing to its containing more *oxygen*, which is the acidifying principle.

---

* *Nitrogen* and *oxygen.*—One ounce of this acid ought to dissolve an ounce of limestone.

ALKALIA, ET EORUM SALES.

PREPARATIONS OF AMMONIA.

Ammoniæ Subcarbonas.—Liquor Ammoniæ.—Liquor Ammoniæ Acetatis.—Liquor Ammoniæ Subcarbonatis.

AMMONIÆ * SUBCARBONAS.

Stimulant, antacid, antispasmodic, five gr. to fifteen.

Muriate of Ammonia,—Prepared Chalk.

Decomposition.—An exchange of acids takes place, the *ammonia* giving its *muriatic acid* to the *lime* of the chalk, forming a *muriate of lime*, and the *chalk* parting with its *carbonic acid* to the *ammonia*, with which it is sublimed—forming a *subcarbonate of ammonia* †.

---

* Ammonia is a volatile alkali.

† This is called a *sub*-carbonate, because there is an insufficiency of carbonic acid to saturate the ammonia.

LIQUOR AMMONIÆ*.

Antacid, five drops to twenty.

Muriate of Ammonia,—Fresh Lime,—Water.

Decomposition.—The *muriatic acid* unites with the *lime*, forming an insoluble *muriate of lime*, and the *ammonia* being dissolved by the water, is ordered to be distilled.

LIQUOR AMMONIÆ ACETATIS.

Diaphoretic, one fluid dr. to one fluid oz.

Subcarbonate of Ammonia,—Acetic Acid.

Decomposition.—The *carbonic acid* of the subcarbonate is disengaged, and flies off, and the *ammonia* forms with the *acetic acid* an *acetate of ammonia.*

LIQUOR AMMONIÆ SUBCARBONATIS.

Stimulant, *diuretic*, half a fluid dr. to one fluid dr.

---

* Ammonia is composed of hydrogen and nitrogen.

PREPARATIONS OF POTASS.

Liquor Potassæ.—Liq. Pot. Subcarb.—Pot. cum Calce.—Pot. Fusa.—Pot. Acetas.—Pot. Carbonas.—Pot. Subcarbonas.—Pot. Sulphas.—Pot. Supersulphas.—Pot. Tartras.

LIQUOR POTASSÆ.

Antacid, lithontriptic, five drops to half a fluid dr.

Subcarbonate of Potass,—Fresh Lime,—Distilled Water.

Decomposition.—The *carbonic acid* unites with the *lime*, forming a *carbonate of lime*, which remains on the filter, leaving the *potass* dissolved in the water.

POTASSA CUM CALCE.

This is merely a mechanical mixture of lime and potass.

POTASSA FUSA.

Liquor of Potass.

The heat evaporates the water, leaving the potass in a solid state.

POTASSÆ ACETAS.

Diuretic, ten gr. to one dr.

Subcarbonate of Potass,—Acetic Acid.

Decomposition.—The *carbonic acid* being expelled, the *potass* unites with the acetic acid, forming an acetate of potass in solution, to be obtained by crystallization.

POTASSÆ CARBONAS.

Diuretic, antacid, ten gr. to half a dr.

Subcarbonate of Potass,—Subcarbonate of Ammonia,—Water.

Decomposition.—The *ammonia* being driven off by the heat employed, its *carbonic acid* forms with the *sub*carbonate an *imperfect* carbonate of potass.

POTASSÆ SULPHAS.

Cathartic, half a dr. to three dr.

Supersulphate of Potass,—Subcarbonate of Potass.

Decomposition.—The superabundant sulphuric acid is neutralized by the *potass* of the *subcarbonate*, and the carbonic acid is expelled.

POTASSÆ SUPERSULPHAS.

Cooling, cathartic, half a dr. to two dr.

Is the salt which remains after the distillation of nitric acid.

POTASSÆ TARTRAS.

Cathartic, one dr. to four.

Subcarbonate of Potass,—Supertartrate of Potass,—Water.

Decomposition.—The *carbonic acid* of the subcarbonate being expelled, the potass unites with the superabundant tartaric acid of the supertartrate. A perfect tartrate is the result.

PREPARATIONS OF SODA.

Soda Tartarizata.—Sodæ Carbonas.—Sodæ Subcarb. exsiccata.—Sodæ Sulphas.

SODA TARTARIZATA.

Cathartic, two dr. to six.

Subcarbonate of Soda,—Supertartrate of Potass,—Water.

Decomposition.—The *carbonic acid* is expelled, and the *soda* is taken up by the excess of *tartaric acid*; a triple salt is thus formed, consisting of tartaric acid, soda, and potass.

SODÆ CARBONAS.

Antacid, ten gr. to one dr.

Subcarbonate of Soda,—Water,—Subcarbonate of Ammonia.

Decomposition.—The ammonia being driven off by the heat, its carbonic acid is taken up by the soda*.

SODÆ SUBCARBONAS† EXSICCATA.

Antacid, *diuretic*, *lithontriptic*, five gr. to half a dr.

Its water of crystallization is driven off.

---

* This preparation is an *imperfect* carbonate of soda.

† Salts owe their transparency and form to the water of crystallization they contain.

SODÆ SULPHAS.

Cathartic, two dr. to two oz.

Super Sulphate of Soda (*which remains after the distillatio of Muriatic Acid*),—Subcarbonate of Soda.

Decomposition.—The *super* abundant acid is saturated with th *soda* of the subcarbonate, and the *carbonic acid* escapes *.

---

* Soda and potass are fixed alkalies; the former is considered a mineral and the latter a vegetable alkali.

TERRÆ, ET EARUM SALES.

ALUMEN EXSICCATUM.

Astringent, ten gr. to half a dr.

The water of crystallization is driven off.

ALUM,

Consists of sulphuric acid, alumina, and a little potass.

CALCIS MURIAS,

Is the salt which remains after the distillation of the subcarbonate of ammonia.

CALX,

Limestone (Chalk),

Is subjected to a fierce heat, in order to expel its carbonic acid; a pure lime is the result.

MAGNESIA *.

Antacid, cathartic, one scr. to two dr.

Carbonate of Magnesia.

The heat drives off the carbonic acid; pure magnesia is the result.

MAGNESIÆ CARBONAS.

Sulphate of Magnesia,--Subcarbonate of Potass,—Water.

Decomposition.—An exchange of acids takes place. The *sulphuric acid* forms with the *potass* a soluble *sulphate of potass*, and the *carbonic acid* forms with the *magnesia* an insoluble *carbonate of magnesia.*

---

* This preparation should be kept in glass stopper bottles.

METALLA, ET EORUM SALES.

PREPARATIONS OF ANTIMONY.

Antimonii Oxydum.—Antimonii Sulphuretum Præcipitatum.—Antimonium Tartarizatum.—Liquor Antimonii Tartarizati.—Pulvis Antimonialis.

ANTIMONII OXYDUM.

Alterative, diaphoretic, two gr. to fifteen.

Tartarized Antimony,—Subcarbonate of Ammonia,—Water.

Decomposition.—The *ammonia* parts with its *carbonic acid,* and forms, with the *tartaric acid* and *potass* of the *antimony,* a triple salt in solution, and the *oxide of antimony* is precipitated.

ANTIMONII SULPHURETUM PRÆCIPITATUM.

Alterative, diaphoretic, one gr. to five.

Sulphuret of Antimony,—Liquor of Potass,—Water.

Decomposition.—The water being decomposed into its constituents, *hydrogen* and *oxygen*, the potass unites with the sulphur, and attracts the hydrogen.

The antimony being oxidized by the oxygen, is dissolved by the hydro-sulphuret of potass; the sulphuric acid then unites with the potass, a portion of hydrogen escapes, and the oxide of antimony is precipitated, minutely blended with sulphur, and some sulphuretted hydrogen.

ANTIMONIUM TARTARIZATUM *.

Emetic, one gr. to three; *diaphoretic, expectorant*, one-eighth gr. to half gr.

Sulphuret of Antimony,—Nitrate of Potass,—Supertartrate of Potass,—Sulphuric Acid,—Water.

The antimony decomposes the nitrate of potass, and becomes oxidized at the expence of the nitric acid, forming a protoxide of antimony; part of the sulphuric acid is supposed to act upon this protoxide; if so, a subsulphate of antimony and potass is the result.

---

* I confess, I cannot explain the theory of this decomposition satisfactorily.

The supertartrate of potass being added, and the whole thrown into water, a triple salt is obtained in solution, consisting of tartaric acid, antimony, and potass.

The *sulphur* of the *sulphuret* is left on the filter in the early stage of the process.

PULVIS ANTIMONIALIS *.

Sulphuret of Antimony,—Hartshorn Shavings.

Decomposition.—The sulphur of the sulphuret, and the gelaten of the hartshorn shavings, are destroyed by the heat employed. The antimony attracts oxygen from the air, and unites with the phosphate of lime.

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* This preparation is a mechanical mixture of phosphate of lime and antimony.

PREPARATION OF SILVER.

ARGENTI NITRAS.

(Used in Epilepsy), one-eighth gr. to one gr.

Silver,—Nitric Acid,—Water.

Decomposition.—The *silver* decomposes *part* of the *nitric acid*, and becomes oxidized; nitrous gas escapes, and the *oxide of silver* is dissolved by the remaining acid, as it forms.

PREPARATIONS OF ARSENIC.

Arsenici Oxydum Sublimatum.—Liquor Arsenicalis.

LIQUOR ARSENICALIS.

(Used in Agues), two drops to twelve.

Sublimed Oxide of Arsenic,—Subcarbonate of Potass *(from Tartar)*,—Water,—Compound Spirit of Lavender.

Decomposition.—The *arsenious acid* forms with the *potass* a solution of *arseniate of potass.*

PREPARATIONS OF COPPER.

Cuprum Ammoniatum.—Liquor Cupri Ammoniati.—Cupri Sulphas.

CUPRUM AMMONIATUM.

Antispasmodic, a quarter gr. to five gr.

Sulphate of Copper,—Subcarbonate of Ammonia.

Decomposition.—The *ammonia* forms with the *sulphate of copper* a triple salt, consisting of sulphuric acid, ammonia, and copper; the *carbonic acid* escapes.

PREPARATIONS OF IRON.

Ferrum Ammoniatum.—Ferri Subcarbonas.—Ferris Sulphas.—Ferrum Tartarizatum.—Liquor Ferri Alkalini.—Tinctura Ferri Muriatis.—Vinum Ferri.—Pilulæ Ferri cum Myrrha.—Mistura Ferri Composita.

MISTURA FERRI COMPOSITA.

Tonic, emmenagogue, one fluid oz. to two.

Sulphate of Iron,—Subcarbonate of Potass,—Water.

The sulphuric acid combines with the potass, and the carbonic acid with the oxide of iron.

FERRUM AMMONIATUM.

Tonic, emmenagogue, five gr. to fifteen.

Subcarbonate of Iron,—Muriate of Ammonia.

Decomposition.—The iron parts with its carbonic acid, and combines with the muriate of ammonia, forming a submuriate of ammonia and iron.

FERRI SUBCARBONAS.

Tonic, emmenagogue, three gr. to ten.

Sulphate of Iron,—Subcarbonate of Soda,—Water.

Decomposition.—An exchange of acids is effected; the *soda* taking the *sulphuric acid* of the *iron*, forming in solution a *sulphate of soda*, while the *iron* takes the *carbonic acid* of the *soda*, forming an insoluble subcarbonate of *iron*.

FERRI SULPHAS.

Tonic, gr. two to six.

Iron,—Sulphuric Acid,—Water.

Decomposition.—Part of the water being decomposed, the iron is oxidized at its expence; it then unites with the sulphuric acid, and is dissolved by the remaining water.

FERRUM TARTARIZATUM *.

Tonic, astringent, five gr. to fifteen.

Iron,—Supertartrate of Potass,—Water.

)ecomposition.—The iron is oxidated by attracting oxygen from the water and atmospheric air; the superabundant tartaric acid combines with this oxide, and a triple salt is obtained.

LIQUOR FERRI ALKALINI.

Tonic, emmenagogue, half a fluid dr. to five.

Iron,—Nitric Acid,—Water,—Liquor of Subcarbonate of Potass.

ecomposition.—The *iron* is oxidized at the expense of *part* of the *nitric acid*, and is dissolved by the remaining acid as it forms; the *subcarbonate of potass* being added, gives off its *carbonic acid*, and the *potass* forms, with the *nitrate of iron*, a *solution of alkaline iron.*

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* A tartrate of potass and iron.

TINCTURA FERRI MURIATIS.

Tonic, ten drops to half a fluid dr.

Subcarbonate of Iron,—Muriatic Acid,—Rectified Spirit.

Decomposition.—The *carbonic acid* escapes, and the iron is taken up by muriatic acid; this muriate of iron is dissolved by the spirit.

VINUM FERRI*.

Tonic, *astringent*, ten drops to half a fluid oz.

Iron Filings,—Wine.

Decomposition.—The *tartaric acid* of the *wine* oxidizes the *iron*, and dissolves it as it forms.

PREPARATIONS OF MERCURY.

Hydrargyri Nitrico-Oxydum.—Hydr. Oxydum Cinereum.—Hydr. Oxyd. Rubrum.—Hydr. Oxymurias.—Hydr. Submur.—Hydr.

---

* A solution of tartrate of iron.

Sulphuretum Nigrum.—Hydr. Sulphuretum Rubrum.—Hydrargyrum cum Creta.—Hydrargyrum Præcipitatum Album.—Hydr. Purificatum.—Liquor Hydrargyri Oxymuriatis.—Pilulæ Hydrargyri.—Pilulæ Hydrargyri Submuriatis Compositæ.—Linimentum Hydrargyri.—Unguentum Hydrargyri Fortius.—Ung. Hydr. Mitius.—Ung. Hydr. Nitratis.—Ung. Hydr. Nitrico-oxydi.—Ung. Hydr. Præcipitati Albi.

HYDRARGYRI NITRICO-OXYDUM.

(Used externally as a detergent escharotic.)

Mercury,—Nitric Acid,—Water.

Decomposition.—The *mercury* is oxidized, and dissolved by the *nitric acid*, forming *a nitrate of mercury.* The heat being increased, *nitrous gas* is evolved, and the preparation is reduced to a *sub*-nitrate of mercury.

HYDRARGYRI OXYDUM CINEREUM.

Antisyphilitic, one gr. to three.

Submuriate of Mercury,—Liquor of Lime.

Decomposition.—The muriatic acid of the mercury unites with the lime in solution, and the grey oxide is precipitated.

HYDRARGYRI OXYDUM RUBRUM.

Antisyphilitic, one-fourth of a gr. to two gr.

Purified Mercury.

Decomposition.—The mercury, being volatilized by the heat employed, is enabled to attract oxygen from the air; a red oxide is the result.

HYDRARGYRI OXYMURIAS.

Antisyphilitic, one-eighth of a gr. to half a gr.

Purified Mercury,—Sulphuric Acid,—Muriate of Soda.

Decomposition.—The mercury is oxidized, and dissolved by the sulphuric acid. This being evaporated to dryness, a salt is obtained, which is an oxysulphate of mercury; muriate of soda being added, its muriatic acid unites with the oxide of mercury, forming an oxymuriate of mercury, which is sublimed, leaving the sulphuric acid in combination with the soda.

HYDRARGYRI SUBMURIAS.

Alterative, antisyphilitic, one gr. to two; and *Cathartic*, three grains to ten.

Oxymuriate of Mercury,—Purified Mercury.

Decomposition.—The purified mercury is oxidized at the expence of part of the oxygen of the oxymuriate. Sublimation assists the combination of the two oxides, and the result is a muriate of mercury*.

HYDRARGYRI SULPHURETUM NIGRUM.

Alterative, five grains to one scr.

Purified Mercury,—Sublimed Sulphur.

Decomposition.—The mercury is slightly oxidized, and combines with the sulphur.

HYDRARGYRI SULPHURETUM RUBRUM.

Alterative, five grains to one scr.

Purified Mercury,—Sublimed Sulphur.

Decomposition.—The mercury being oxidized, unites intimately with the sulphur, *by the assistance of heat.*

---

* The London College call it a *sub*-muriate, to prevent mistakes

HYDRARGYRUM CUM CRETA.

Alterative, ten gr. to one dr.

Purified Mercury,—Prepared Chalk.

Decomposition.—The mercury is mechanically mixed with the carbonate of lime (or chalk).

HYDRARGYRUM PRÆCIPITATUM ALBUM.

(Externally used as a detergent.)

Oxymuriate of Mercury,—Muriate of Ammonia,—Liquor of Subcarbonate of Potass,—Water.

Decomposition.—The muriate of ammonia combines with the oxymuriate of mercury, and renders it more soluble in water; thus we obtain a supermuriate of mercury and ammonia; the subcarbonate of potass being added, the potass takes a portion of the muriatic acid, and remains in solution; a muriate of ammonia and mercury being precipitated, the *carbonic acid* escapes.

HYDRARGYRUM PURIFICATUM.

Mercury,—Iron Filings.

Decomposition.—The iron filings are used under the idea that they have a greater affinity for any matter the mercury may be mixed with.

PREPARATIONS OF LEAD.

Liquor Plumbi Subacetatis.—Liquor Plumbi Subacetatis dilutus. —Plumbi Superacetas.—Emplastrum Plumbi.

LIQUOR PLUMBI SUBACETAS*.

Semi-vitreous Oxide of Lead,—Acetic Acid.

Decomposition.—The acetic acid unites with the lead, and remains in solution.

PLUMBI SUPERACETAS †.

Astringent, half a gr. to two gr.

Carbonate of Lead,—Acetic Acid.

Decomposition.—The *carbonic acid* escapes, and the lead combines with the acetic acid.

---

* This I conceive to be an acetate of lead in solution.

† This is called a super-acetate, because there is more acid than the lead requires to saturate it.

PREPARATIONS OF ZINC.

Calamina Præparata.—Zinci Oxydum.—Zinci Sulphas.—Unguentum Zinci.

ZINCI OXYDUM.

Tonic, antispasmodic, one gr. to three.

ZINC.

The zinc being assisted by heat, is oxidized by the air; a white oxide of zinc is the result.

ZINCI SULPHAS.

Emetic, ten gr. to one scr.; *tonic, astringent,* half a gr. to three.

Zinc,—Sulphuric Acid,—Water.

Decomposition.—The zinc effects a decomposition of the wa-

ter, and becomes oxidized. The sulphuric acid dissolves the oxide, and the *sulphate of zinc* is then evaporated to dryness.

PREPARATIONS OF SULPHUR.

Oleum Sulphuratum.—Potassæ Sulphuretum.—Sulphur Lotum.—Sulphur Præcipitatum.—Unguentum Sulphuris.—Unguent. Sulphuris compositum.

POTASSÆ SULPHURETUM.

***Diaphoretic*, three gr. to one scr.**

Washed Sulphur,—Subcarbonate of Potass.

***Decomposition.*—The *carbonic acid* being disengaged, the sulphur unites with the potass, forming a sulphuret of potass.**

SULPHUR PRÆCIPITATUM.

Cathartic, diaphoretic, one scr. to two dr.

Lime,—Sulphur,—Water,—Muriatic Acid.

Decomposition.—First, the sulphur attracts a portion of hydrogen from the water, and unites with the lime, forming an hydroguretted sulphuret of lime in solution; the muriatic acid then enters into combination with the lime, the hydrogen escapes, and the sulphur is precipitated.

A TABLE,

Shewing in what Proportion Opium and Preparations of Antimony, Arsenic, and Mercury, enter various Compounds.

36 grains of Confection of Opium, contain one grain of Opium.

5 grains of the Pills of Soap with Opium, contain one grain of Opium.

10 grains of Powder of burnt Hartshorn with Opium, contain one grain of Opium.

2 scruples of Compound Powder of Chalk with Opium, contain one grain of Opium.

10 grains of Compound Powder of Ipecacuanha, contain one grain of Opium.

1 scruple of Compound Powder of Kino, contains one grain of Opium.

3 grains of Mercury with Chalk, contain one grain of Mercury.

5 drachms of Liniment of Mercury, contain one drachm of Mercury.

2 fluid ounces of Liquor of Oxymuriate of Mercury, contain one grain of Oxymuriate of Mercury.

3 grains of the Pills of Mercury, contain one grain of Mercury.

4 grains of the Compound Pills of Submuriate of Mercury, contain one grain of Mercury.

2 drachms of Strong Mercurial Ointment, contain one drachm of Mercury.

6 drachms of the Mild Mercurial Ointment, contain one drachm of Mercury.

4 fluid drachms of the Liquor of Tartarized Antimony, contain one grain of Antimony.

2 fluid drachms of the Arsenical Liquor, contain one grain of Oxide of Arsenic.

IMPORTANT PREPARATIONS.

onfectio Opii; anodyne, stimulant, ten gr. to thirty-six.

xtractum Opii; narcotic, anodyne, half gr. to three gr.

ilulæ Saponis cum Opio; anodyne, narcotic, two gr. to six.

ulvis Cornu Usti cum Opio; anodyne, absorbent, three gr. to fifteen.

ulvis Ipecacuanha Compositus; anodyne, sudorific, five gr. to one scruple.

ulvis Cretæ Compositus cum Opio; anodyne, absorbent, astringent, ten gr. to two scruples.

lvis Kino Compositus; anodyne, astringent, five gr. to one scruple.

nctura Camphoræ Composita; diaphoretic, anodyne, wenty drops to half an oz.

nctura Opii; anodyne, ten drops to thirty.

num Opii; anodyne, ten drops to one fluid dr.

her Rectificatus; antispasmodic, stimulant, twenty drops o half a fluid dr.

ritus Ætheris Aromaticus; diaphoretic, stimulant, half a uid dr. to two fluid dr.

ritus Ætheris Nitrici; diuretic, stimulant, ten drops to wo dr.

Spiritus Ætheris Sulphurici; antispasmodic, stimulant, twent drops to two dr.

Spiritus Ætheris Compositus; cordial, stimulant, half a flui dr. to two dr.

Tinctura Digitalis; narcotic, diuretic, one drop to thirty.

Infusum Digitalis; narcotic, sedative, half a fluid oz. to on fluid oz. and half.

Digitalis Folia; narcotic, diuretic, half gr. to three gr.

Extractum Conii; alterative, narcotic, gr. one to ten.

Conii Folia; narcotic, two gr. to one scr.

Hyoscyami Folia; narcotic, diaphoretic, two gr. to fifteen.

Extractum Hyoscyami, one gr. to five

Aconiti Folia; narcotic, deobstruent, one gr. to five.

Extractum Aconiti; narcotic, stimulant, one gr. to five.

Extractum Elaterii; cathartic, one quarter gr. to two gr.

Ipecacuanha Radix; emetic, five gr. to one scr.; diaphoretic expectorant, half gr. to two gr.

Jalapæ Radix; cathartic, ten gr. to one dr.

Radix Scillæ; diuretic, expectorant *(fresh)* one gr. to three *(dried)* five to ten.

Cortex Cinchonæ lancifoliæ;
——— oblongifoliæ;
——— cordifoliæ;
} tonic, febrifuge, ten gr. t two dr.

Ammoniacum; antispasmodic, expectorant, ten gr. to one scr

THE END.

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THE

SCHOOLBOY'S MANUAL,

AND

YOUNG MAN'S MONITOR;

BEING A

COLLECTION OF SCRIPTURAL EXTRACTS,

AND OTHER

MORAL AND PRUDENTIAL MAXIMS;

DESIGNED AS AN ANTIDOTE TO THE CORRUPTIONS OF THE WORLD AND OF THE HUMAN HEART IN THE EARLY STAGES OF LIFE.

"Train up a child in the way he should go: and when he is old, he will not depart from it."

Prov. xxii. 6.

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PREFACE.

THE object of this little selection of passages from Scripture is to place before young people a sketch of the Christian character, as a sort of model to form their own characters upon; at a time of life when they are apt to think they have nothing to do but to attend to their lessons and their amusements. It appears to the Author that the moral character is generally formed too late in life; and that it is the result of chance rather than system, and formed without any model, except that of unconnected and desultory instruction. Whilst we are in a state

of pupilage we are apt to think that we have nothing to do in the business of our education but to learn our appointed tasks: and when our pupilage has ended, we fancy that our education has ended too; and that we have nothing to do but to attend to our pleasures or our worldly interests. So that the character is left to form itself from chance impressions and desultory observation, without any defined model, or any precise aim, or any system of principles established in the mind. Our notions of virtue are vague, general, and undefined: and the moral instruction diffused through the different subjects of our studies is so interwoven with other things, that it wants the efficiency of a condensed operation. The Author has therefore thought, that by embodying the Chris-

tian character in a little collection of Scriptural extracts, embracing its principal details, he might present to the minds of young persons a model to form their characters upon, from the occasions which the early scenes of life present to them ; and a standard to which they might refer their daily actions for the approval or disapprobation of their own consciences. The habit of making such a daily reference would establish the principles firmly in the mind: and the frequency of their application in the details of common life would, with the Divine blessing, produce by degrees an established character of virtue. If this habit was begun, and continued through the whole state of pupilage, our education and moral character would grow up together: and by the

time the former was finished, the latter would have acquired such a consistency, as would enable us to enter upon the functions of manhood with a manly competency.

In making this selection, the Author has attempted to bring into view the principal topics of moral instruction in as concise a form as possible; avoiding the two extremes of undefined generalities and a burdensome prolixity of details. He considers the proposed model as entirely comprised in the Scriptural extracts, which, in conformity with the practice of the Jews enjoined by Divine authority, he would recommend to be learnt perfectly by heart; and the observations contained in the succeeding parts as practical and prudential, rather than elementary and fundamental. At the

same time he can say, that they are not the result of any speculative views of human life, but that most of them have been suggested by his own actual experience. Although in the list of virtues several are nominally omitted, they are all included in some or other of those enumerated. The list of books is one which (he conceives) can hardly fail to make a good man, if duly attended to; although there are many more such in the world, and (excepting the two first) possibly some better. In the arrangement of his own remarks he has thrown such of them as did not appear to require much discussion, as nearly as possible, into the form of apophthegms; and those which required more amplification he has introduced in a practical essay. A few slight alterations have been occasionally

made in the form of the Scriptural extracts for the sake of connexion: but he trusts there is none in the substance, nor any deviation from the pure doctrines of Scripture. If the system he has recommended should be thought too exclusive, he has adopted it from a conviction that the purity of the mind is best preserved by an ignorance of evil, and its efficiency by a singleness of pursuit. And as it is considered essential to the perfection of a drama or an epic poem, that some leading design should prevail throughout the whole of it, so he conceives that a corresponding unity of object is essential to the perfection of the moral character. So long as this is kept constantly in view, he would not preclude the acquisition of any knowledge which is calculated to advance the main design.

He thinks he may say, that the discipline he has recommended is not only warranted by express passages of Scripture, but conformable to the general tenour and spirit of it. And if it should be thought to interfere too much with our worldly pursuits or our worldly pleasures, he thinks that objection is sufficiently answered by the passages he has cited in the second section. If the Gospel is our moral code, we have no option as to the practice of it. And it was probably to prevent any compromise between that and our passions, or the ever changing habits of society, that St. James affirmed that "whosoever shall "keep the whole law, and yet offend "in one point, he is guilty of all." (James ii. 10.) And it is worthy of remark, that the occasion on which he

made this declaration was little more than a matter of etiquette. The Author wishes it to be understood that he considers this little sketch as applying principally to the moral part of the Christian character, and that he leaves the details of religious faith and practice, except such of them as are too indispensable to be passed over even in a treatise of ethics, to more able and appropriate instructors; considering it sufficient for his present design, which is principally to shew to young persons what they are required to *do* in the common conduct of life, to refer to Scripture for all his authorities; without the slightest intention of setting up morality as a thing separable from, or independent of religion; but on the contrary expressly declaring, that it is only the

fruit and practical result of it, and that without a continual dependence upon the Divine grace and blessing, all human attempts at moral perfection must be ineffectual. He will only further observe, that the instructions he has suggested are calculated for different periods in the progress of education; and that the time and manner of communicating them must be left to the discretion of parents and instructors. And if his experience should enable any of the rising generation to attain to excellence without his errors, he would consider himself as rewarded in their attainments, and living again in their perfections.

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To the Scriptural Extracts.

Practical Apophthegms.

Practical Essay.

Prayers.

PART I.

ON THE FEAR AND SERVICE OF GOD.

REMEMBER *now* thy Creator in the days of thy *youth*, while the evil days come not, nor the years draw nigh, when thou shalt say, " I have " no pleasure in them."

Eccles. xii. 1.

The *fear of the Lord* is the beginning of WISDOM. A good understanding have all they that do thereafter.

Psal. cxi. 10.

Seek the Lord while He may be found, and call upon Him while He is near.

Isa. lv. 6.

Set the Lord *always* before you.

Psal. xvi. 8.

Whether ye eat or drink, or whatsoever ye do, do *all* to the glory of God.

1 Cor. x. 31.

Whatsoever ye do, do it heartily as to the Lord, and *not unto men.*

Col. iii. 23.

ON THE LOVE OF THE WORLD.

SET your affection on things *above*, and not on things on the earth.

Col. iii. 2.

Love not the world, *neither the things that are in the world.* If any man love the world, *the love of the Father is not in him.*

1 John ii. 15.

Ye cannot serve God and Mammon.

Matt. vi. 24.

Be not *conformed* to this world.

Rom. xii. 2.

The *fashion* of the world passeth away.

1 Cor. vii. 31.

The *friendship* of the world is enmity with God.

James iv. 4.

My kingdom is not of this world.

John xviii. 36.

If any man will come after me, let him *deny himself*, and take up his cross, and follow me.

Matt. xvi. 24.

He that taketh not his cross, and followeth after me, is not worthy of me.

Matt. x. 38.

BEATITUDES.

BLESSED are the *poor in spirit:* for theirs is the kingdom of Heaven.

Blessed are they that *mourn:* for they shall be comforted.

Blessed are the *meek:* for they shall inherit the earth.

Blessed are they that do *hunger and thirst after righteousness:* for they shall be filled.

Blessed are the *merciful:* for they shall obtain mercy.

Blessed are the *pure in heart:* for they shall see God.

Blessed are the *peace-makers:* for they shall be called the children of God.

Blessed are they which are *persecuted* for righteousness' sake: for theirs is the kingdom of Heaven.

Matt v. 3, &c.

WARNINGS.

BUT woe unto you that are *rich!* for ye have received your consolation.

Woe unto you that are *full!* for ye shall hunger.

Woe unto you that *laugh* now! for ye shall mourn and weep.

Woe unto you when all men shall *speak well of you!* for so did their fathers to the false prophets.

Luke vi. 24, &c.

OF THE SPIRIT AND THE FLESH.

If any man have not the *spirit* of Christ, he is none of His.

Rom. viii. 9.

Walk in the *Spirit*, and ye shall not fulfil the lust of the *flesh*.

Gal. v. 16.

If ye live after the *flesh*, ye shall die: but if ye through the *Spirit* do mortify the deeds of the body, ye shall live.

Rom. viii. 13.

The works of the flesh are these; adultery, fornication, uncleanness, lasciviousness, idolatry, witchcraft, hatred, variance, emulations, wrath, strife, seditions, heresies, envyings, murders, drunkenness, revellings, and such like: of the which I tell you before, as I have also told you in time past, that they which do such things *shall not inherit the kingdom of God*.

But the fruit of the Spirit is love, joy, peace, long-suffering, gentleness,

goodness, faith, meekness, temperance. Against such there is no law. And they that are Christ's have crucified the flesh with the affections and lusts.

Gal. v. 19.

OF THE BODY AND THE SPIRIT.

KNOW ye not that your body is the *Temple of the Holy Ghost?*

1 Cor. vi. 19.

If any man defile the *Temple of God,* him will God destroy: for the Temple of God is *holy;* which Temple ye are.

1 Cor. iii. 17.

Therefore glorify God in your *body,* and in your *spirit,* which are God's.

1 Cor. vi. 20.

This is the will of God, even your sanctification: that every one should know how to possess his vessel in sanctification and honour.

1 Thess. iv. 3, 4.

OF THE EYE OF PROVIDENCE.

THE eyes of the Lord are in *every place*, beholding the evil and the good.

Prov. xv. 3.

There is nothing covered that shall not be revealed, nor hid that shall not be known.

Matt. x. 26.

Because sentence against an evil work is not executed speedily, therefore the heart of the sons of men is set to do evil.

Eccles. viii. 11.

But God shall bring every work into judgement, with *every secret thing*, whether it be good, or whether it be evil.

Eccles. xii. 14.

Fear not them that kill the body, but are not able to kill the soul: but rather fear Him which is able to destroy both soul and body in Hell.

Matt. x. 28.

OF LUXURY IN FOOD AND CLOTHING.

Take no thought, saying, "What "shall we *eat?*" or "What shall we *drink?*" or "Wherewithal shall we be *clothed?*" for after all these things do the Gentiles seek: for your Heavenly Father knoweth that ye have

need of all these things. But seek ye first *the kingdom of God* and his righteousness, and all these things shall be added unto you.

Matt. vi. 31, &c.

A man's life consisteth not in the abundance of the things which he possesseth.

Luke xii. 15.

Man shall not live by bread alone, but by *every word of God.*

Luke xiv. 4.

The kingdom of God is not *meat and drink,* but righteousness, and peace, and joy in the Holy Ghost.

Rom. xiv. 17.

He that in *these things* serveth Christ, is acceptable to God and approved of men.

Rom. xiv. 18.

ON THE VALUE OF THE SOUL, AND THE MEANS OF OBTAINING ETERNAL LIFE.

WHAT is a man profited if he shall gain the whole world, and *lose his own soul?* Or what shall a man give in exchange for his soul?

Matt. xvi. 26.

What shall I do to inherit *eternal life?* Thou shalt *love the Lord thy God,* with all thine heart, and with all thy soul, and with all thy strength, and with all thy mind; and *thy neighbour as thyself.* This do, and thou shalt live.

Luke x. 25, &c. Matt. xix. 16, &c.

This is the love of God, that we *keep his commandments.*

1 John v. 3.

He that *hath my commandments and keepeth them*, he it is that loveth Me.

John xiv. 21.

If ye keep my commandments, ye shall abide in my love. And he that loveth me shall be loved of my Father, and I will love him, and will manifest myself to him.

John xv. 10; xiv. 21.

Without me (saith Our Saviour Christ) ye can do nothing: but whosoever believeth in me shall never die; and whatsoever ye shall ask of the Father in my name, He will give it you.

John xv. 5; xi. 26; xvi. 23.

Eye hath not seen, nor ear heard, neither have entered into the heart of man, the things which God hath prepared for them that love Him.

1 Cor. ii. 9.

These things I command you, that ye *love one another*. If the world hate you, ye know that it hated Me before it hated you. The servant is not greater than his Lord.

John xv. 17, &c.

Love (even) your enemies, and bless them that curse you, do good to them that hate you, and pray for them that despitefully use you and persecute you; that ye may be the children of your Father which is in Heaven: for He maketh His sun to rise on the evil and on the good, and sendeth rain on the just and on the unjust.

Matt. v. 44.

He that loveth not his brother whom he hath seen, how can he love God whom he hath not seen?

1 John iv. 20.

ON JUSTICE AND RETRIBUTION.

WHATSOEVER ye would that men should do to you, do ye even so to them.

Matt. vii. 12.

With the same measure that ye mete withal it shall be measured to you again.

Luke vi. 38.

Render to all their dues: tribute to whom tribute is due; custom to whom custom; fear to whom fear; honour to whom honour.

Rom. xiii. 7.

It is more blessed to give than to receive.

Acts. xx. 35.

ON FILIAL REVERENCE.

HONOUR thy father and thy mother, that thy days may be long in

the land which the Lord thy God giveth thee.

Exod. xx. 12.

A wise son maketh a glad father; but a foolish son is the heaviness of his mother.

Prov. x. 1.

The father of the righteous shall greatly rejoice; but the father of a fool (that is of a perverse and wicked person) hath no joy.

Prov. xxiii. 24; xvii. 21.

Honour thy father with thy whole heart, and forget not the sorrows of thy mother.

Eccles. vii. 27.

Whoso honoureth his father shall have joy of his own children; and when he maketh his prayer, he shall be heard.

Eccles. iii. 5.

ON PATIENCE.

LET *Patience* have her perfect work; and be patient toward all men.

James i. 4; 1 Thess. v. 14.

He that is *slow to anger* is better than the mighty; and he that ruleth his spirit than he that taketh a city.

Prov. xvi. 32.

Let not the sun go down upon your wrath.

Ephes. iv. 26.

Shall we receive good at the hand of God, and shall we not receive evil?

Job ii. 10.

What glory is it if when ye be buffeted for your faults ye take it patiently? But if when ye do well and suffer for it ye take it patiently, this is acceptable with God.

1 Pet. ii. 20.

For Christ also suffered for us, leaving us an example that we should follow *his steps;* who did no sin, neither was guile found in His mouth; who, when He was reviled, reviled not again; when He suffered, He threatened not; but committed Himself to Him that judgeth righteously.

1 Pet. ii. 21.

Be ye therefore perfect, as your Father which is in Heaven is perfect.

Matt. v. 48.

ON TRUTH.

LET not mercy and *truth* forsake you.

Prov. iii. 3.

Lying lips are an abomination to the Lord: but they that deal truly are His delight.

Prov. xii. 22.

The Lord is a God of truth, and requireth truth in the inward parts.

Deut. xxxii. 4; Psal. li. 6.

The Lord abhorreth the deceitful man; but the lip of truth shall be established for ever.

Psal. v. 6; Prov. xii. 19.

ON CAUTION AND ASSIDUITY.

WORK out your own salvation with *fear and trembling*.

Phil. ii. 12.

For wide is the gate and *broad* is the way that leadeth to *destruction*, and *many* there be that go in thereat:

But strait is the gate and *narrow* is the way that leadeth unto *life*, and *few* there be that find it.

Matt. vii. 13, 14.

Strive to enter in at the *strait gate*: for many will seek to enter in, and *shall not be able.*

Luke xiii. 24.

Many are called, but *few* are chosen.

Matt. xx. 16.

ON VANITY AND HUMILITY.

BE not *high-minded*, but *fear.*

Rom. xi. 20.

Let nothing be done through strife or *vain-glory;* but in lowliness of mind let each esteem other better than themselves.

Phil. ii. 3.

Be not desirous of *vain-glory*, envying one another, but be clothed with *humility:* for God resisteth the *proud*, but giveth grace to the *humble.*

Gal. v. 26; 1 Pet. v. 5.

Whosoever exalteth himself shall be abased, but he that humbleth himself shall be exalted.

Matt. xxiii. 12.

ON THE GOVERNMENT OF THE TONGUE.

If any man seem to be religious, and bridleth not his *tongue*, but deceiveth his own heart, that man's religion is vain.

James i. 26.

Render not evil for evil, nor *railing* for railing, but contrariwise blessing.

1 Pet. iii. 9.

Speak evil of no man.

Tit. iii. 2.

Avoid *jesting*, and *foolish talking*.

Ephes. v. 4.

Every *idle word* that men shall speak, they shall give an account thereof at the day of judgement.

Matt. xii. 36.

Above all things, my brethren, *swear not.*

James v. 12.

Let no *corrupt communication* proceed out of your mouth; but that which is good to the use of edifying, that it may minister grace unto the hearers.

Ephes. iv. 29.

Let no man despise thy youth, but be thou an example unto others, in word, in conversation, in charity, in spirit, in faith, in purity.

1 Tim. iv. 12.

Be not partaker of other men's sins, but keep thyself pure.

1 Tim. v. 22.

ON VIGILANCE AND TEMPTATION.

Put on the *whole armour of God*, that ye may be able to stand against the wiles of the *Devil*. For we wrestle not against flesh and blood, but against principalities, against powers, against the rulers of the darkness of this world, against *Spiritual wickedness* in high places.

Ephes. vi. 11, 12.

Be sober, be vigilant, because your adversary the Devil, as a roaring lion, walketh about, seeking whom he may devour, whom *resist*, stedfast in the faith.

1 Pet. v. 8, 9.

Watch and pray, that ye enter not into temptation.

Matt. xxvi. 41.

Let no man say, when he is tempted, "I am tempted of God;" for God cannot be tempted with evil, neither tempteth He any man.

James i. 13.

Resist the Devil, and he will flee from you.

James iv. 7.

Get thee behind me, Satan: for it is written, "Thou shalt worship *the* "*Lord thy God*, and Him only shalt "thou *serve*."

Luke iv. 8.

ON KNOWLEDGE.

If any man think that he *knoweth* any thing, he knoweth nothing yet as he ought to know: but

if any man *love God*, the same is known of Him.

1 Cor. viii. 2, 3.

The wisdom *of this world* is foolishness with God. The Lord knoweth the thoughts of the *wise* that they are *vain*.

1 Cor. iii. 19, 20.

Know the *Holy Scriptures*, which are able to make thee *wise unto salvation*, through faith in Christ Jesus.

All Scripture is given by *inspiration of God*, for instruction in righteousness, that the man of God may be *perfect*, thoroughly furnished unto all good works.

2 Tim. iii. 15.

Beware lest any man spoil you through *philosophy*, or vain deceit, after the tradition of men, after the

rudiments of the world, and not after Christ.

Col. ii. 8.

Avoid profane and vain babblings, and oppositions of *science*, falsely so called. But exercise thyself rather unto *Godliness:* for Godliness is profitable unto *all things*, having the promise of the life which *now is*, and of that which is *to come*.

1 Tim. vi. 20; iv. 7, 8.

ON RESIGNATION.

DESPISE not thou the *chastening of the Lord*, nor faint when thou art rebuked of Him: for whom the Lord loveth He chasteneth, and scourgeth every son whom He receiveth.

Heb. xii. 5, 6.

All that will live godly in Christ Jesus shall suffer persecution.

2 Tim. iii. 12.

Take the prophets who have spoken in the name of the Lord for an example of suffering affliction and of patience.

James v. 10.

The Captain of our salvation was made perfect through suffering.

Heb. ii. 10.

If we suffer, we shall also reign with Him.

2 Tim. ii. 12.

The sufferings of this present time are not worthy to be compared to the glory that shall be revealed in us.

Rom. viii. 18.

Blessed are they that are persecuted for righteousness' sake; for theirs is the kingdom of Heaven.

Matt. v. 10.

ON CHARITY.

THOUGH I speak with the tongues of men and of angels, and have not *Charity*, I am become as sounding brass or a tinkling cymbal.

And though I have the gift of prophecy, and understand all mysteries and all knowledge; and though I have all faith, so that I could remove mountains, and have not Charity, I am nothing. And though I bestow all my goods to feed the poor, and though I give my body to be burnt, and have not Charity, it profiteth me nothing. Charity *suffereth long* and *is kind*; Charity *envieth not*; Charity *vaunteth not itself*, is not puffed up, doth not *behave itself unseemly*, *seeketh not her own*, is *not easily provoked*, *thinketh no evil*, rejoiceth

not in iniquity, but *rejoiceth in the truth, beareth all things*, believeth all things, hopeth all things, endureth all things.

1 Cor. xiii. 1, &c.

ON TRUST IN PROVIDENCE.

TRUST thou in the Lord with all thy might, and lean not to thy own understanding.

Prov. iii. 5, 6.

Commit thy works unto the Lord, and thy thoughts shall be established.

Prov. xvi. 3.

The race is not to the swift, nor the battle to the strong.

Eccles. ix. 11.

Except the Lord build the house, their labour is but lost that build it.

Psal. cxxvii. 1.

Every good and every perfect gift is from above, and cometh down from the Father of lights, with whom is no variableness, neither shadow of turning.

James i. 17.

It is better to trust in the Lord than to put any confidence in man: it is better to trust in the Lord than to put any confidence in princes.

Psal. cxviii. 8, 9.

Without faith it is impossible to please God: but faith without works is dead, being alone; and without holiness no man shall see the Lord.

Heb. xi. 6; xii. 14. James ii. 17.

Therefore let us run with patience the race that is set before us, looking

unto Jesus the author and finisher of our faith: and let us not be weary of well doing; for in due time we shall reap, if we faint not.

Heb. xii. 1, 2. Gal. vi. 9.

ON PRAYER.

Worship the Lord in the beauty of holiness.

Psal. xxix. 2.

In every thing by prayer and supplication let your requests be made known unto God

Phil. iv. 6.

Ask, and it shall be given you; seek, and ye shall find; knock, and it shall be opened unto you.

Matt. vii. 7.

The Lord is nigh unto all them that call upon Him ; yea unto all such as call upon Him *faithfully*.

Psal. cxlv. 18.

The prayer of the upright is His delight ; but if we regard iniquity in our heart, the Lord will not hear us.

Prov. xv. 8. Psal. lxvi. 18.

Remember the Sabbath-day to keep it *holy*.

Exod. xx. 8.

At the name of JESUS every knee shall bow, of things in Heaven, and things in earth, and things under the earth.

Phil. ii. 10.

There is none other name under Heaven given among men whereby we must be saved ; neither is there salvation in any other.

Acts iv. 12.

Whosoever shall be ashamed of me and of my words (saith Christ), of him shall the Son of man be ashamed, when He shall come in His own glory, and in His Father's, and of the holy angels.

Luke ix. 16.

It is a good thing to give thanks unto the Lord, and to sing praises unto the name of the Most High; to shew forth His loving-kindness in the morning, and His faithfulness every night.

Psal. xcii. 1, 2.

Let the people praise Thee, O God! yea, let all the people praise Thee.

Psal. lxvii. 3.

Let every thing that hath breath praise the Lord!

Psal. cl. 6.

Write them on the table of your *heart*.

Prov. iii. 8.

Think of them when thou sittest in thine house, and when thou walkest by the way, and when thou liest down, and when thou risest up.

Deut. vi. 7.

And be a *doer* of the word, and not a hearer only.

James i. 22.

So shalt thou find favour and good understanding, in the sight of God and man.

Prov. iii. 4.

Discenda.

Patience Truth Meekness Piety Generosity	*Nursery, &c.*
Frugality Self-denial Sober-mindedness Purity Liberality Brotherly-kindness Fortitude	*School, &c.*
Humility Diligence Contemplation Charity	*Every where.*

The whole duty of man, to God, ourselves, and our neighbours, may be briefly comprehended in three things, namely,

Piety, Purity, Charity.

Legenda.

Bible—*Daily.*

Prayer Book { Frequently; particularly Psalms, Gospels, and Epistles; not omitting to peruse occasionally the offices of Baptism, Catechism, Confirmation, Matrimony, and Burial; and also the Articles of Religion.

Robinson's Scripture Characters.
Scott's Christian Life.
Taylor's Holy Living and Dying.
Nelson's Private Devotions.
Nelson's Festivals, &c.
Thomas à Kempis.
Sermons various.

Now and then attend a *funeral*, and witness the end of human glory.

Never trifle in the House of God; nor forget His presence in the place where His honour dwelleth.

Let your Bible be your "Vade mecum."

PART II.

OF CONSCIENCE AND PRIVATE JUDGMENT.

NEVER trifle with your convictions. But if any thing appears *to you* to be wrong, (unless it is enjoined by some authority to which it is your duty to surrender your private judgment) reject it instantly.

" To him that esteemeth any thing to be " unclean, to him *it is* unclean."

Rom. xiv. 14.

We shall be judged by our own consciences, and not by those of others.

" Happy is he that condemneth not " himself in that thing which he alloweth."

Rom. xiv. 22.

OF CONFIDENCE AND SECURITY.

Never think that you have mastered any of your corruptions, and have no further cause for watchfulness.

"Let him that thinketh he standeth "take heed lest he fall."

1 Cor. x. 12.

Do not be confident of your own strength, but always carry about you a consciousness of your weakness.

The best way to avoid evil is to keep out of the way of it. Human nature is too weak to trust a parley. And as you pray to God not to lead you into temptation, take care not to lead *yourself* into it.

ON PLEASURE.

Beware of *pleasure*, in all its varied forms. The wisest and the best of men

have always considered it as an enemy to virtue.

Our Saviour made it his "meat and "drink" to do the will of God.

Let your pleasures be derivative rather than original; the consequence of your exertions rather than the object of them: and let them all be connected with some purpose beyond that of bare enjoyment.

Do not go much to public amusements. They injure the purity and simplicity of the mind, and give us a distate for spiritual things. If they do not *destroy* religion, they *weaken* it; by becoming a sort of rivals to it, and occupying a place in the mind long after they are past.—It is better to be ignorant of those things which there is no profit in recollecting.—The beauties of nature, the varieties of art, the elegancies of literature, the details of charity, and the charms of social converse and secret meditation, are sufficient to employ the leisure hours of any reasonable person.—The pleasures derived from these are more

in unison with the true character and relations of man; and do no violence to those principles and feelings which it is the object of our studies and moral discipline to cultivate and establish.

If either bodily or mental health requires amusements of a more active nature, they must be resorted to like other medicines, and used with moderation, caution, and discretion.

Do not store the mind with impertinences. They occupy the place of better things, and cannot be weeded out again. The mind cannot forget things, if it would. Therefore take care how you admit any guest into it which you can never get rid of. Let all its images (as far as you can) be rational, pure, and innocent; and such as will be fit for that Heavenly residence to which you aspire to carry them.

If you want subjects for meditation,

" Whatsoever things are true,

" Whatsoever things are honest,

" Whatsoever things are just,

" Whatsoever things are pure,
" Whatsoever things are lovely,
" Whatsoever things are of good report;
" if there be any virtue, if there be any
" praise, think on *these things.*"

Phil. iv. 8.

OF CURIOSITY AND FASTIDIOUSNESS.

Be not over-anxious to *see* things; nor too much gratified by any thing that is pleasing to the eye. It fills the mind with useless images, if not the heart with useless desires.

St. John condemns the *lust of the eye*, together with the lust of the flesh and the pride of life.

1 John ii. 16.

Do not accustom the eye to indulgence, any more than the palate; nor suffer it to become craving, critical, or fastidious.

There is hardly any stronger proof of

virtue than to be satisfied and pleased with *common things*.

" If thine eye be single, thy whole body " shall be full of light. But if thine eye " be evil, thy whole body shall be full of " darkness."

Matt. vi. 22.

" Look not at the things which are seen, " but at the things which are not seen: " for the things which are seen are tempo- " ral, but the things which are not seen are " eternal."

2 Cor. iv. 18.

OF KNOWLEDGE AND STUDY.

Do not affect a variety of knowledge, nor study any thing for the purpose of display.

Let *truth* be the principal object of your studies; either moral, physical, or intellectual.—Virtue is the practice of *moral* truth.

Avoid as much as possible every

thing that gives false views, either of God, man, or nature; and works which detail disordered passions; or are calculated to make *impressions* unfavourable to virtue, notwithstanding some moral truth may be contained in them.

Never take poison because you possess an antidote, nor drink muddy water when you can get it clear.

Be sparing of poetry, and all works of fancy, except of a moral or religious kind: and admit into your studies no more of fiction, than what is calculated to improve the moral faculties, or tends to illustrate or embellish truth.

Be cautious of newspapers, reviews, and pamphlets; and do not attempt to know more of the world than your station in life requires.

The less we *know* of moral evil, the less difficulty we shall have in abstaining from it.—It is *familiarity* that breeds contempt; —that blunts the edge of moral sensibility, and makes us look upon virtue and vice indifferently.

It was the opinion of Locke that each man's profession and his religion are sufficient to employ his whole faculties.

Let all other studies be subservient to these: and undertake none but what have some tendency to the promotion either of piety, purity, or charity.

It is better to be ignorant of many things that other people know. The fewer the subjects of your contemplation are, the more profoundly you will think upon them, and the better you will practise them. The Bible alone contains a world of thought. And if your ignorance of many other things makes you appear inferior to others, be contented to appear so. It is both a mark and an exercise of humility. St. Paul, the most learned of all the Apostles, after he embraced Christianity, "determined to "know nothing but Jesus Christ and Him "crucified." And Our Saviour has expressly told us that he who is *least* amongst us here shall be greatest in the kingdom of Heaven.—But let not this be an excuse for idleness. That is worse than promiscuous knowledge.

The garden of the mind must be constantly dressed; and weeds will be continually springing up in it, if the cultivation is neglected. No knowledge is in itself evil, provided it neither corrupts the mind, misleads the understanding, nor usurps the place of better attainments. While therefore you continue in a state of pupilage, be assiduous in learning what is pointed out to you: and when you have the selection of your own studies, endeavour to be "wise "unto that which is good, but *simple* con- "cerning evil." (Rom. xvi. 19.)—The most learned of mankind, whether by reading or experience, are not always the best: and the knowledge that makes us vain, or indifferent to virtue, is food converted into poison.—Take care therefore that your humility keeps pace with your acquirements; and observe how they affect the purity of your mind, and the rectitude, zeal, and simplicity of your affections. And remember, that though you speak with the

tongues of men and of angels, and have not charity, you are nothing.

Be careful to preserve a due *subordination* in your studies: and let not a fritter of general knowledge destroy the ascendency of leading objects. The gradual expansion of the mind by useful and connected knowledge is better than a medley of scraps and fragments; from which few general principles can be deduced, or few useful and practical reflections suggested. The inferences which the mind draws from progressive knowledge, though later in their growth, are much more valuable than the hasty gleanings of a rapid excursion over the whole field of analogy; and in comparison with them will be like wheat separated from the chaff, or purified gold from the refiner's fire.—The last knowledge we acquire upon a subject is generally the best; and, like the key-stone of an arch, gives firmness and stability to all the rest. It also exercises the mind in deeper thought

and more comprehensive reasoning; and at the same time that it restrains its natural levity, gives it a deeper insight into the wonders of Creation, the insufficiency of man, and the wisdom of Omnipotence.

The knowledge which results from our own reflexions is generally more impressive and lasting than that which is acquired. It is the very marrow of our intellectual food, and resembles the ripeness of the summer fruits.—It would be well if we could devote a small portion of each day to reflection. It makes what we have learnt our own, and gives it assimilation, character, and connexion. It may be practised in our walks, as well as in our studies, and is most profitable when exercised upon the noblest subjects.

Let the operations of your mind upon what you read resemble those of the body on the food we eat; imbibing and retaining the useful parts, and throwing the bad away. There is hardly any thing that

may not be made the instrument either of good or of evil, according to the use we make of it. " To the pure all things are " pure; but them that are defiled and " unbelieving is nothing pure." (Titus i. 15.) Whilst a vicious mind turns every thing to evil, a virtuous mind turns all things into good;—

" Finds tongues in trees, books in the running brooks,
" Sermons in stones, and good in every thing."

The planets are drawn towards their several centres by a *continual* attraction. A centrifugal force is constantly drawing them away from them: and the balance of these two preserves them in their orbits, and produces in their motions that beauteous harmony, which has been denominated the Music of the Spheres. The mind of man should feel a similar attraction towards GOD, the centre of life and excellence; in order to counteract that love

of the world, which is *always* drawing it in an opposite direction.

The history of David is *almost* a perfect example of this Divine tendency of the heart and the affections: the history of Our Saviour (whom we are required to imitate, 1 Pet. ii. 21) is entirely so.—" Not my " will, but thine be done," was the sentiment always uppermost in His mind.

Do not seek the applause of men; but look to God, and to Him only. " Whatsoever you do, do it heartily as to " the Lord, and not unto men."

Keep your eye upon the " One thing " needful," and the due employment of the talent which God has entrusted to you. Consider all other things as mere expletives: and use them only as they are necessary to recruit your powers, or strengthen the bonds of social charity.

Beware of Pleasure.

Beware of Vanity.

Beware of the Applause of men.

PART III.

VIRTUE consists principally in moral *restraint*, or the due regulation of those passions and appetites which nature has implanted in us. This is what is called in Scripture *self-denial*.

Man appears to be the lowest in the scale of Creation, or the first in the ascending scale of intellect, in whom a voluntary self-government is required. The passions of other animals are generally restrained or regulated by *nature*: but man is required to restrain *his own*. Whilst we are children we are restrained by others: and as the restraints of others are gradually taken off, we ought to lay them voluntarily on *ourselves*. It never was intended that we should live without restraint at any time.

For nature prompts us to an unlimited indulgence; but reason, truth, and virtue, deny it to us. For this purpose reason is implanted in the breast of man in a higher degree than in all other animals: that by means of this faculty he may govern *himself*, and control that liberty with which it is accompanied. It is no excuse for our failings to say that they are *natural*, because our nature is *corrupt*. But God has given us reason and revelation as antidotes to this corruption; and if we refuse to make use of them, we are wilful transgressors, and have no apology. Almost the whole business of life is to master the corruptions of our nature; which has been so distorted by the transgression of our first parents, that we are naturally more inclined to evil than to good. The heathens were aware of this vicious propensity; but being ignorant both of God and of his laws, and destitute of that Divine light which has revealed to us the fatal secret, they neither knew how to account for it, nor how to correct it. They

were aware that the natural tendencies of the human mind were at variance with its own chief good, and that it was desirable to control them by practical restraints and moral discipline. But Revelation has unfolded to us both the cause and extent of man's degeneracy; and has confirmed the suggestions of reason and conscience on the necessity of restraining our natural liberty. The Scripture expressly says, that we are by nature born in sin; and that "if we "live after the flesh, (or nature) we shall "die: but if we through the Spirit do "mortify the deeds of the body, we shall "live." (Rom. viii. 13.)

What are the several virtues, recorded either by heathen or Christian moralists, but the restraints of natural propensities? What are temperance, chastity, meekness, justice, but the restraints of something to which nature is inclined? And even the active virtues, such as courage, industry, charity, &c. imply a conquest over natural selfishness.

Therefore be ever jealous of your liberty, and accustom yourself to habits of *self-control.* Man is in no respect superior to the beasts, if he does not exercise this restraint. Nay, he is even inferior to them; because he acts no better with the faculty of reason than they do without it. *He* is accountable for what he does, because he can discern betwixt good and evil. But if he makes no use of this discernment, it were better for him that he did not possess it. God did not give us the two great lights of reason and Revelation to be disregarded. He will require at our hands the use we have made of them, and great will be our condemnation if we have neglected them. The precepts of religion are not arbitrary injunctions, to deprive us of the enjoyment of rational liberty; but the details of moral and social excellence, resulting from the immutable laws of God, and the relations of social and created beings. It is probable that all rational creatures who have suffered no degeneracy obey them without

constraint, from the excellence of their nature and the rectitude of their affections. But since man has fallen from the state of innocence in which he was created, he is become a sort of anomaly in the Creation; and his natural propensities are repugnant to his highest interests, and to the relation in which he stands to God and to the universe.

The principle of self-denial, even in necessary things, was known and acknowledged by the heathen moralist:—

> " Quanto quisque sibi plura negaverit,
> " A Diis plura feret."——
>
> HOR.

Our Saviour has told us in express terms that every servant of His must take up his *cross*, and follow Him. And although it is not required of the generality of Christians to suffer for Him as the Apostles and martyrs did, I conceive there are three things in which *every man* is required to take up his cross daily and constantly.

First, in *cutting off all permitted sins.*

Secondly, in *renouncing all useless pleasures.* And,

Thirdly, in voluntarily undertaking a *life of labour.*

The first of these, which is by far the most difficult, is also the most indispensable. The whole tenour of Scripture confirms it, and the passages which expressly declare it are innumerable.

" The wages of sin is death."

Rom. vi. 23.

" He that committeth sin is of the Devil."

1 John iii. 8.

" Whosoever is born of God doth not " commit sin."

1 John iii. 9.

" Let every one that nameth the name of " Christ depart from iniquity."

2 Tim. ii. 19.

" Whosoever shall keep the whole law, " and yet offend in one point, he is guilty " of all."

James ii. 10.

With regard to *Pleasure*, besides its tendency to corrupt the mind, it is a waste of our faculties, a neglect of our stewardship, and a dissipation of the talent which God has entrusted to us: except so much of it as is necessary to recruit our strength, and give due refreshment to the body and the mind. The waste of our time and talents is a great evil, but the corruption of our minds is still worse. The things which constitute our ordinary pleasures generally address themselves to the inferior parts of our nature. And though these must be sustained in their due proportion, the more pleasure we take in departing from the dignity of our being, the less successful will be our efforts to exalt and purify it. If our business here is to prepare ourselves to associate with celestial spirits, (Heb. xii. 22, 23.) we must endeavour to acquire something of a celestial temperament. We have no reason to believe that any great change will take place in the character at our deaths. (Rev. xxii. 11.) And if our

present affections are to remain to all eternity, we should endeavour to place them upon objects of a corresponding permanency. (Col. iii. 2.) There must be some deep cause for sorrow in human nature, when Our Saviour pronounces a blessedness on those that mourn. The pious and the virtuous are not entirely at a loss to know what it is: the impious and the profligate have no comprehension of it. And when we consider how much He Himself both mourned and suffered, to rescue us from a condition from which we are not yet emancipated, there is something indecent in our revelry, as well as incongruous.—Remember that life is a *pilgrimage*, (1 Pet. ii. 1,) and that it is the duty of pilgrims to pursue their journey steadily, without either loitering on the way, or turning to the right or left in pursuit of pleasure.—Never let pleasure come into competition with duty. And the more temperate it is in its quality, and the more limited in its duration, the less likely it is to do so.

With regard to *Labour*, it was part of the curse pronounced upon Adam and his posterity, that in the sweat of their brow they should eat bread. It never could be the intention of God that any of Adam's descendants should be exempt from it. And though from the nature of human institutions some few are enabled to live without it, the power does not confer the right; and the parable of the talents shews that the unprofitable servant will be most severely condemned. Our Saviour made it his "meat and drink to do the will of God." It was never intended that there should be any drones in the hive of human society: and St. Paul expressly says that "he that "will not work, neither shall he eat." (2 Thess. iii. 10.)—Remember that life is a *stewardship*, that we are not the owners of any thing we possess, and that we shall have to give an account of all that we have received, whether it be much or little.—The profession of those whose circumstances have placed them above the necessity of any

other is Charity; which embraces all the modes we possess of doing good to others, the claims of justice being first attended to. Every person possesses the power of doing this by some of his faculties, however moderate they may appear: and Our Saviour has told us that whosoever shall give to one of his disciples a cup of cold water only for his sake shall in nowise lose his reward. (Matt. x. 42. Mark. ix. 41) This exercise of charity bears the strongest resemblance to the profession and practice of Our Saviour; and the power of performing it demands our highest gratitude, and the exercise of it is delightful to every generous heart.

Beware of *idle and promiscuous thought*, at times when the mind is disengaged from business. It is then that vanity, vice, and folly creep in, and undermine the barriers which virtue has erected. It is better to have some determinate object even in our recreations. Sauntering about without an object, or lounging within doors in

listless inactivity, unnerves the mind; and leaves it a pray to vicious imaginations, which, in the severer hours of business or study, we should easily repel. It is the weakness of the mind at such times that makes it a matter of so much consequence what objects are presented to it at others. As it can then do little else but reflect upon the images which it already contains, it is of the utmost importance that they should be rational and innocent, and that our reflections should partake as much as possible of the nature of our studies and our duties.—Let the mind be always usefully employed even in the intervals of business. Repress all vain and vicious fancies; and never indulge yourself in thinking of things which your conscience would not permit you to do.

One of the greatest preservatives of virtue, to persons who are not employed in constant labour, is *Temperance*. There is such a close connexion and mutual dependence between the body and the mind, that each of them suffers from the disorders of

the other. As the passions of the mind are known materially to affect the functions of the body, so the state of the body affects in a high degree the powers, the feelings, and the disposition of the mind. And it is hardly possible to destroy in either of them that equal balance of all its functions in which health consists, without injuring the other almost in an equal proportion. Every degree of intemperance tends to destroy this balance in the body, and the corresponding self-possession of the mind. And although the effect of each individual act may be hardly perceptible, the habit of oppressing the bodily functions, either by quantity or quality, brings on a morbid state of feeling both in the body and the mind; and in proportion as it renders self-government more necessary, makes it at the same time more difficult and less efficacious. If therefore you wish to keep the mind tranquil, and pure, and free, and vigorous, keep the body light, and cool, and temperate; supplying it only with such portions as

health requires, but never oppressing it for the sake of indulgence.

Be careful not to *criticise* the conduct or characters of others; nor be hasty to believe all you hear of them. The world is so censorious, that we cannot live much in it without hearing others both rashly and unjustly condemned. And if they do act wickedly or foolishly, what is that to us? Our business is with ourselves alone, and we have no right to judge another. (Rom. ii. 1, &c.) He who can master his own corruptions will be able to do more than any man has done yet: and it will be soon enough for us to cast a stone at others when we are without faults ourselves. Try to know *yourself*. It is the most difficult to acquire of all knowledge. And they who know themselves best are generally the least inclined to condemn others.

Be equally careful also not to *ridicule* them. This is in fact judging them, as well as the other, although in a different manner.

They are both severely condemned in Scripture; and David has mentioned it as a characteristic of the blessed, that he "has "not sat in the seat of the scornful." (Psal. i. 1.) We are very prone from our earliest years to laugh at those who differ from ourselves, in speech, manners, or appearance; as if nothing was right but what we do ourselves. But it generally happens that those who are despised and laughed at by others are both wiser and better than those who laugh at them. Laughter is more a mark of folly than of wisdom at all times. But laughing at others because they are different from ourselves is a mark of great pride, ignorance, and presumption. Those who indulge themselves in this propensity will not only laugh at the follies and eccentricities of others, but at their misfortunes, their vices, and even their virtues. This is totally inconsistent both with humility and charity, and "the ornament of a meek "and quiet spirit." (1 Pet. iii. 4.) It has been remarked of Our Saviour that He

never laughed, although He often wept. And had He ever done so, the vices, the follies, or the sufferings of men, are the last things which his compassionate heart would have suffered Him to laugh at.—" Woe " unto you who laugh now! for ye shall " mourn and weep."

Be careful also that you are not deterred *yourself* from any thing that is right, or led into any thing that is wrong, by the censure or ridicule of others. You must expect to meet with a great deal of both in the world, if you act a wise, virtuous, and conscientious part. For, " as " in former days he that was born after the " flesh persecuted him that was born after " the Spirit, even so it is now." (Gal. iv. 29.) Be open to advice and friendly counsel, and take all due pains to ascertain your duty: but if your own conscience approves of what you are doing, or condemns what you are desirous of declining, accustom yourself to disregard the ridicule of others, and even their hatred. " Marvel not, my

" brethren, if the world hate you." (1 John iii. 13.) " Ye know that it hated me before " it hated you." (John xv. 18.) " Be " stedfast, unmoveable, always abounding " in the work of the Lord, forasmuch as " you know that your labour is not in vain " in the Lord." (1 Cor. xv. 58.) And " be not weary of well-doing; for in due " time you shall reap, if you faint not." (Gal. vi. 9.) Carry your own character with you into society, and do not assimilate it to every other you meet with. Be conformable to others in all matters of indifference, but make no compromise in those which are essential. If you meet in society with what you cannot approve of, do not encourage it, if you do not openly condemn it. Virtue requires from us this negative protection; and an unpresuming silence should offend no one.

In your expenditure be at the same time frugal and liberal. The former of these is the fountain which supplies the latter; and the union of the two is the per-

fection of human economy.—The economy of nature is very remarkable. The whole animal creation eat one another up; and the vegetable world is renewed by its own corruption. And, in order to prevent waste in our domestic establishments, God has provided pigs and poultry, to eat up the refuse. These again are eaten in their turn, and nothing is lost in nature's housewifery. —Exercise your frugality most in those things which affect yourself, your liberality in those which affect others. If you have not much to give, exercise charity by *abstaining;* and give away "meat, clothes, "and fire," by restraining yourself from every superfluous use of them. Charity has a thousand invisible forms; as many as there are occasions of preferring others to ourselves. A meal, a game, an argument, may give it scope, and every collision of desires or interests. Remember too, that it is as much a part of charity to require little of others as to give much ourselves. The latter may often not be in our

power, or not consistent with higher duties; (1 Tim. v. 8;) the former always is; and it is not confined to articles of cost, but extends to *every thing* we observe in others. A liberal mind is *always giving*, even "without money and without price;" and, instead of devouring the substance of others, it thrives upon its own privations. At the same time there is something due to ourselves, which both justice and charity require us to accept. To give away this would be waste rather than charity. But measure your own portion with a jealous eye; and never suffer it to encroach too much upon the wants, the comforts, or the desires of others.—The secret of virtue is to abjure selfishness.

Accustom yourself to see the *hand of God* in every thing that happens to you externally. For God exercises a separate and distinct government over the affairs of each individual, as well as a general one over the whole Creation. This is what is called the *special* providence of God. It would be inconsistent with His wisdom, power, and

goodness, to suffer any thing to happen to us by *chance:* and though few words are oftener in the minds of men, there is in fact no such thing. Our Saviour says, that "not a sparrow falls to the ground without "our Father," and "the very hairs of our "heads are all numbered." (Matt.x. 29,30.) Even in a *lottery*, "the lot is cast into the "lap, but the whole disposing thereof is of "the Lord." (Prov. xvi. 33.) We readily acknowledge the hand of God in great events, but are apt to overlook it in little ones: whereas they are *all* instances of his government over us, and constitute the daily trials that He lays us under. The temper and conduct of those we live with*, and the little cross *accidents* (as we erroneously call them) which constantly happen to us, are trials which God is continually presenting to us for the exercise, growth, and improvement of our *virtues.* Some of these are called into action every day by these little trials: and by continual exercise they

* See Bishop Horne's Dissertations.

acquire a degree of strength and firmness which no trifles can afterwards shake. Be careful therefore always to meet these trials with the corresponding virtues: and, instead of giving way to anger and vexation, as thoughtless people are apt to do, acknowledge the hand of God in each of them, and ask yourself what virtue He is then calling upon you to exercise.—"Speak, Lord, for "thy servant heareth." (1 Sam. iii. 9.) Remember too that God tries us by good, as well as by evil; the one tempting us to pride or indulgence, the other to anger and malignity: that all our virtues may be practised in succession, and that we may be able to bear *every thing* as we ought. Be therefore always upon your guard at every *fresh occurrence:* remember the hand from which it comes, and meet it with the virtue it was designed to exercise.

Try to enlarge your views every morning, to fortify your mind against trifling irritations. Contemplate for a few minutes the adorations of a boundless Universe; the

glories of an immortal blessedness; the sufferings of an incarnate God; and the loveliness of an universal charity. And when you have done this,—think of the littleness of your own vexations!—Never suffer your mind to dwell on irritating details. Push forward to the nobleness of an expansive charity. Learn to forget as well as to remember; and do not stumble at a mole-hill when you are surveying a mountain.

Let your character be open, manly and ingenuous; but at the same time gentle, modest, and compassionate: disdaining every thing that is base and sorbid, and condescending to every thing that is kind and generous. Let your motives and your actions be such as to require the least possible secrecy; and let your deportment betoken the rectitude of your intentions, at the same time that it confesses the insufficiency of your attainments. Make no unhandsome comparisons between yourself and others; and assume no superiority for any of your endowments. Use all the advantages you possess to increase the

general stock of virtue and happiness; and without inquring too minutely into the pretensions of others, remember that "it is "more blessed to give than to receive." It has been observed by an excellent man and an elegant writer (Paulinus), that "nothing "we can acquire is more valuable or more "lovely than humility. It is (he remarks) "the chief preserver of all the other virtues: "nor is there any thing that renders us so "pleasing both to man and to God, as to be "high by the excellency of our lives, and "low by the exercise of humility*." This character of mind becomes *every man*, in the degenerated state of human nature, whatever may be his attainments or natural endowments. For man is the only creature we know of (except the fallen angels) that does not fulfil the purposes of his creation, and obey the perfect law of God *in every thing*: and although there are moral differences between us, the best of us is below the condition of innocence, and his feelings

* See the translation of his excellent epistle to Colantia, in the "Bioscope."

with respect to merit can be only negative. The myriads of stars which late inventions have enabled us to discover, never deviate from their appointed course by the dimension of a hair: all the inferior animals upon this earth obey the several instincts which God has given them in every thing: and man is the only creature we observe, who is an exception to the rest of the Universe. An ingenuous mind, which disdains to claim what it is not entitled to, will naturally feel something of sorrow for this common degradation, in which every man's conscience tells him how greatly he participates, and which sufficiently accounts for Our Saviour's commending what the world may call a slavish and an abject spirit. But an ingenuous sorrow for moral deficiency is the sorrow of a noble, rather than of a recreant mind; and consistent with the most exalted notions both of the glory of God, the excellence of virtue, and the hatefulness of moral delinquency. But a pretension to worth and dignity under the consciousness

of positive deficiency is the mark of a sordid and disingenuous mind; which is satisfied with the appearance of excellence without its reality, and claims for the counterfeit what is only due to the principal. An ingenuous modesty, under the actual condition of human nature, is a manly feeling; and it savours more of an exalted spirit, than high pretensions coupled with low performances.

Do not expect to pass through life without *affliction*. There are but few whose lot it is to do so; and those perhaps are not to be envied on that account. The Scripture says, that "whom the Lord loveth He "chasteneth, and scourgeth every son "whom He receiveth." (Heb. xii. 6.) Affliction is the physic of the soul, which purges it from its earthly corruptions: and although we are all desirous of avoiding it, there are few among the thoughtful and well disposed who have experienced it, and not acknowledged themselves to be the better for it. "Before I was afflicted (says David) "I went astray: but now have I

" kept thy word." (Psal. cxix. 67.) We are all willing to flatter ourselves that our intentions are so good, and our moral attainments so perfect, that God will not find it necessary to chasten us, however He may chasten others. But the affliction, when it comes, generally discovers in us some latent corruptions which had escaped the languid scrutiny of our prosperous state: and if it detects in us no gross enormities, it serves at least to moderate our earthly affections, to carry our views forward to a future and more exalted state of happiness, and to overcome that narrowness of feeling, which arises from limited views, and weak conceptions of futurity. Although therefore it would be unwise to distress ourselves with the anticipation of afflictions, it is the part of wisdom to prepare ourselves both to meet and to bear them; and to receive them, when they come, as the messengers of mercy, designed for our correction and spiritual advancement. It is a very bad sign, when the

heart is hardened by affliction instead of being improved by it; when God speaks to us in forcible terms, and we refuse to listen to Him. "Though He slay me, yet will "I trust in Him," (Job xiii. 15,) is the language of true piety: and a Christian should not recoil from that discipline, which was exercised upon our Blessed Lord himself, as well as upon the most faithful of his servants in all ages.

In examining your own character, be careful that you are not misled by the feelings of the moment. Such examinations are generally made when the mind is tranquil, the passions calm, and the wants of nature satisfied. In such a state, being under no temptation to evil, we feel and admire the beauty of virtue. But as our great moralist, Dr. Johnson, says, "Most "hearts are pure while temptation is away. "It is easy to awaken generous sentiments "in privacy; to despise death when there is "no danger; to glow with benevolence "when there is nothing to be given.

" While such ideas are formed they are " felt; and self-love does not suspect the " gleam of virtue to be the meteor of " fancy." (Life of Pope.) The only criterion of what we *are* is what we *do*. However we may *feel* in the absence of temptation, the only test of virtue is our conduct under it. Our Saviour says, that a tree is to be judged of by its *fruits*; and that we shall be called " to the resurrection of life " or the resurrection of condemnation," not according to what we have *felt*, but according as we have *done* good or evil. (Matt. vii. 20, 21. Luke vi. 44. 46; xiii. 27. John v. 29. Rom. ii. 6.) Though a door is always open to repentance, the longer it is delayed, the less likely it is to be sincere; and crimes which are committed in anticipation of a future repentance, are probably the most offensive to God of any that we can be guilty of.

Be careful to be always ingenuous with yourself, in deciding upon the lawfulness or expediency of what you do. Most

things in this world contain a mixture of good and evil. A disingenuous mind will look only at one of them; an ingenuous one will compare the two. Be careful to strike the balance with an impartial hand; and never shelter yourself under the mist of uncertainty, when you are able to discover a clear preponderance. It is desirable also not only to observe the nature of things, but the manner in which we are ourselves affected by them. This will not only shew the state of the mind within, but the expediency of many things without. We are not all equally affected by the same things; but it may be said in a moral as well as in a physical sense, that "what is one man's "meat is another man's poison." This inquiry, frequently and impartially made, would solve many questions of expediency, which lie beyond the reach of general rules; and enable us to select our mental food with almost as much accuracy as we do the bodily.

It would be an excellent practice in

the early part of life, to write down every evening a short moral on the occurrences of the day. It would give the mind a habit of thinking, and teach us to appreciate things as they occur. Virtue is a science, which must be learnt like all others, by study and practice combined. A quickness of moral discrimination is its most effective implement. And we might as well expect to play on a violin without having learnt it, as to adjust the conflicting elements of virtue without practical arts and detailed expedients.—One of the most efficacious of these is the formation of *habits*, in those departments of morals in which we find ourselves to be defective. A transient reflection will not conquer habitual neglect, nor strengthen habitual weakness. The disease must be encountered with the whole force and attention of the mind, applied to it *almost exclusively*; till the vicious propensity is overcome, and the opposite virtue grown into a *habit*. It then becomes a part of our nature; a smaller degree of vigilance will

suffice for its continuance; the mind will be at liberty to rectify other defects in a similar manner; and the assemblage of virtuous habits thus acquired, will diffuse a moral beauty and harmony through the whole character.—But whatever expedients may be resorted to by way of moral discipline, (and history furnishes us with a great variety, which the zeal of individuals has invented and applied,) one general caution may be laid down respecting all of them; namely, not to use them in a careless and desultory manner, and with little concern whether they succeed or not: but with a fixed and steady determination to *make* them successful; which with the Divine blessing we can always do (1 Cor. x. 13), at least to the extent of conquering any permitted and habitual sin; constantly bearing in mind that God is "of purer eyes than to "behold iniquity" (Hab. i. 13); that He will not tolerate any unresisted wickedness; and that He considers all who habitually offend even in a single point, as guilty of

despising his authority and violating the whole law. (James ii. 10.)

But above all things be careful to ask the Divine blessing upon all your endeavours, and not to trust to your own exertions only. When man attempts to act independently of God, whatever may be his talents, or even his virtuous resolutions, he is sure to be disappointed. The whole Creation hangs upon the Divine favour, and the highest happiness a creature can enjoy arises from a sympathy with the Divine mind. Prayer is the only link of connexion between God and the human soul that man is conscious of: and, in order that the knowledge and the love of Him should not become extinct in the human bosom, God has expressly commanded that we should pray to Him, and has made it the condition of His bestowing His blessings upon us. (Matt. vii. 7, 8; Phil. iv. 6.) And although He has no need of any information from us as to our wants and necessities, He knows that we have need

of a spiritual intercourse with Him, and that it constitutes the perfection and happiness of His rational creatures. Our Saviour, who in compassion to our forlorn condition has redeemed us by his own blood from the penalties of the offended law, (which requires from man, as probably from all other rational creatures, a perfect obedience to the Divine will, notwithstanding his fall has disabled him from performing it) has also commanded us to pray to God *in His name.* (John xvi. 23, 24.) There is no other name by which we can obtain salvation. (Acts iv. 12.) If therefore we either neglect praying to God at all, or praying to Him in the name of Christ, we have no reason to expect his blessing upon any of our labours, nor any claim to that redemption which Our Saviour has purchased for all true Christians. " Them that honour me (says God) I will honour: but they that despise me shall be lightly esteemed." (1 Sam. ii. 30.) And " whosoever shall be " ashamed of me and my words, (says Our

" Saviour) of him shall the Son of man be " ashamed, when He shall come in His own " glory, and in His Father's, and of the holy " angels." (Luke ix. 26.) The Scriptures also inform us, that it is the influence of God's Holy Spirit upon our hearts which alone can regenerate our corrupted nature. (John iii. 5. Tit. iii. 5.) Our Saviour has promised us that God will give his Holy Spirit to them that *ask for it.* (Luke xi. 13); but He has made no such promise to those who do not. And as we cannot enter into life with an unregenerated nature, it is as necessary that we should pray for the sanctification of the Holy Spirit, as for any other of the means of salvation. Our Saviour also, at the same time that He revealed to the Apostles, and through them to the world, the mysterious nature of the Godhead, instituted certain ordinances which He commanded us to observe, as symbols and channels of communication with Him. These are called by the Church *Sacraments.* And however unnecessary some persons

might think them, had they been only human institutions, Our Saviour's positive command to observe them, (Matt. xxviii. 19; Luke xxii. 19,) and His express declaration that they are necessary to salvation, (John iii. 5; vi. 53,) put them upon an entire equality with all his moral injunctions. It is not for us to prescribe the mode in which the intercourse between God and His creatures is to be conducted; and when God thinks proper to command, it is for man only to obey.—Nothing contributes more to the perfection and happiness of man than exalted notions of God; to contemplate Him in His works and in His providence; to consider Him as pervading all nature, and reigning in the hearts of all His people; as viewing all the actions of men according to the relation they bear to the purposes of His unsearchable wisdom; as whispering to their consciences, through His enlivening and all-pervading Spirit, the solicitations of Charity, Truth, and Purity; and whilst He leaves us to the liberty of an uncontrolled agency,

inviting us to the fountain of light and glory, by exhibiting to our weak and gross perceptions, some of the fainter beauties of moral and intellectual harmony. But when we add to these the manifestation of His love to us, and to all His rational and moral creatures, in vindicating the law which is necessary for their perfection and happiness by His own personal sufferings, (John x. 30; xiv. 7, 9,) rather than that any part of His Creation should perish, His love appears immeasurable, His law inflexible, and the motives to moral obedience are the most interesting and impressive that can operate upon the feelings of a created being. Gratitude, justice, honour, sympathy, life, and death, conspire to demand from us a manly struggle; and when these relations are laid open to our view, every act we commit of wilful delinquency is a violation of the highest principles which can influence the conduct of a rational and moral agent.—Never neglect the habit of daily prayer. It is the only intercourse we have with God in this state of banish-

ment, and the most effectual means of purifying our affections, and preserving the innocence of our lives. The morning sacrifice well performed will give a devotional character to all the occupations of the day. It will sweeten our labours, expand our charities, and give a double relish to all our enjoyments. And the sense of God's continual presence thus early impressed upon us will be our best preservative against the numberless temptations which the occurrences of the day may present to us. And when the hour of retirement comes, the soul, purified from its defilements by the nightly incense, will cease to agitate the wearied frame, and leave it to a sweet repose. Thus, a cordial to us by day and an opiate by night, prayer will invigorate our labours and sweeten our refreshments; while its incense ascends to the throne of grace, and its fruitfulness is recorded in the books of mercy.

In the choice of friends and associates, whether at school, at college, or in any other department of society, select those that are

quiet, studious, and contemplative, rather than those that are bustling, showy, or entertaining. There is a modesty in real wisdom and virtue which seeks rather to conceal than to display itself: and those who possess but little of either, generally make the greatest show of what they have; unless they altogether disregard them both, and devote themselves to pleasure, vanity, and folly. Beware of those who are most entertaining. They are generally persons of superficial knowledge, and but little virtue. If they wish no harm to others, they at least have in themselves but little good. Our countryman, Pope, who understood human nature as much as most men, says that "worth makes the man, but *want* "*of it the fellow.*" A full heart is often a sign of an empty head. And those who have a proper feeling of the serious importance of the duties of life, generally keep their *affections* restrained, as well as their passions and appetites.—"They that are "Christ's have crucified the flesh with the

" *affections* and lusts." (Gal. v. 24.)—Be careful, however, never to judge uncharitably, and remember that every rule has its exceptions. A communicative cheerfulness is often the result of innocence and virtue; the effusion of a mind delighting in its own purity, and anxious to communicate to others a portion of its own felicity. The mirth of such a man is free from rudeness and clamour, affecting neither raillery, wit, nor sarcasm: and it is far removed from that noisy, indiscriminate joy, which proceeds rather from the vacancy of the mind, than the sympathies of an overflowing charity.—Be cheerful in society for the sake of others. But let it be a chastised cheerfulness, expressed with mildness and tempered with humility.—Seek the society of the wise and virtuous; but beware of the applause even of them. Our hearts are so inclined to vanity, that we can be vain even of our humility. Beware of pedantry either in knowledge or in virtue. There are pedants in every department of society;

and those who are proud of their attainments are such, whatever the nature of those attainments may be. Do not go much into society of any kind; but "study "to be quiet, and do your own business." (1 Thess. iv. 11.) Live principally at home. The circle of a man's duties lies generally there, or in the neighbourhood of it; and the less he goes beyond it, the safer he is from temptation, and the better he performs his duties in it.—"As a bird "that wandereth from her nest, so is a man "that wandereth from his place." (Prov. xxvii. 8.) Sit as loose as you can to the things of this world; wean your affections by degrees from earthly objects; and prepare yourself progressively for that state of glory, in which "mortality will be swal-"lowed up of life," and "God will be "all in all."

WHEN born, in tears we saw thee drown'd,
While thy assembled friends around
With smiles their joy confess'd.
So live, that at thy parting hour
They may the flood of sorrow pour,
And thou in smiles be dress'd.

"LIVE whilst you live," the Epicure will say,
"And give to Pleasure every passing day."
"Live whilst you live," the sacred Preacher cries,
"And give to GOD each moment as it flies."
Lord, in my views may both united be,
I live in pleasure when I live to THEE!

DODDRIDGE.

PRAYERS.

MORNING.

O Lord, our Heavenly Father, almighty and everlasting God, who hast kindly brought me to the beginning of another day, accept my thanks for the continuance of Thy mercies and the protection which Thou hast afforded me throughout the night. Be pleased to continue Thy blessings towards me: and grant that this day I fall into no sin, neither run into any kind of danger; but that I may perform my duties to Thee and to Thy creatures with a faithful heart and zealous industry, through Jesus Christ our Lord.

Almighty God, who seest that I have no power of myself to help myself, keep me, I beseech Thee, both outwardly in my body and inwardly in my soul; that I may be defended from all adversities which may happen to the body, and from all evil thoughts which may assault and hurt the soul, through Jesus Christ our Lord.

Let the words of my mouth, and the meditations of my heart, and the actions of my hands, be this day and at all times acceptable in Thy sight, O Lord, my Strength and my Redeemer. And if my heart should be inclined this day to any evil thing, let the recollection of these prayers which I now address to Thee stand before me as a sword to deter me from it. Or if unhappily through thoughtlessness or surprise, I should be led into any actual guilt, let my sorrow be as real as my sin; and let not my eyes again be closed in sleep till I have attempted to obtain Thy pardon.—Hear me, O Lord, for the sake of thy Blessed Son, on whose

atonement I rely, and in whose name I pray to Thee. And for the love which Thou bearest to Him and to Thy creatures, let Thy providence protect me, or Thy mercy pardon me, now, henceforth, and for ever.

Our Father, &c.

EVENING.

O Lord, my God, gracious and merciful, who hast been pleased to bring me to the close of another day, accept my homage for Thy continued mercies, and the poor endeavours which I have made this day to serve Thee. Pardon, I beseech Thee, the imperfection of my services, and grant that they may become every day more acceptable in Thy sight. Enlarge my faculties, and purify my affections, and give me an increased delight in Thy commandments. Let the love of Thee and of my Saviour abound in me ever more and more; and let the influences of Thy Holy Spirit descend continually into my heart, and prepare me for the glories of Thy eternal kingdom.

Pardon, O Lord, I beseech Thee, whatever Thou hast seen amiss in me this day, (particularly) and accept

my sorrows for my many offences: and if I have done any thing that is good in thy sight, I thank Thee for Thy grace which has enabled me to do it. Restore me, O Lord, To thy favour, if by any means I have lost it, and enable me to lie down at peace with Thee, and in charity with all mankind. Protect me, I beseech Thee, this night from danger and from sin; and grant me such refreshment both of body and soul, that I may rise to the discharge of to-morrow's duties with a pure affection and increased efficiency.

These prayers, O Lord, I beseech Thee to accept for the sake of Thy Blessed Son, our Lord and Saviour; whom I hope sometime to behold, with Thee and thy Co-eternal Spirit, in unextinguishable bliss and endless glory; and in whose words I conclude my earthly prayers for all the family of Thy fallen creatures.

Our Father, &c.

FOR PIETY.

LORD of all power and might, who art the Author and Giver of all good things, graft in my heart the love of Thy name, increase in me true religion, nourish me with all goodness, and of Thy great mercy keep me in the same, through Jesus Christ our Lord.

FOR PURITY.

ALMIGHTY GOD, unto whom all hearts be open, all desires known, and from whom no secrets are hid, cleanse the thoughts of my heart by the inspiration of Thy Holy Spirit; that I may perfectly love Thee, and worthily magnify Thy holy name, through Christ our Lord.

FOR CHARITY.

O Lord, who hast taught us that all our doings without charity are nothing worth, send Thy Holy Ghost and pour into my heart that most excellent gift of Charity, the very bond of peace, and of all virtues, without which whosoever liveth is accounted dead before Thee. Grant this, O Lord, for Thy dear Son's sake, Jesus Christ.

FOR INNOCENCE.

Lord, I beseech Thee, grant Thy servant grace to withstand the temptations of the world, the flesh, and the Devil; and with a pure heart and mind to follow Thee the only God, through Jesus Christ our Lord.

FOR THE GUIDANCE OF OUR AFFECTIONS.

ALMIGHTY GOD, who alone canst order the unruly wills and affections of sinful men, grant unto Thy servant that I may love the thing which Thou commandest, and desire that which Thou dost promise; that so among the sundry and manifold changes of the world my heart may surely there be fixed where true joys are to be found, through Jesus Christ our Lord.

FOR THE IMITATION OF CHRIST.

ALMIGHTY GOD, who hast given Thine Only Son, to be unto us both a sacrifice for sin, and also an example of godly life; give me grace that I may always most

thankfully receive this His inestimable benefit, and also daily endeavour myself to follow the blessed steps of His most holy life, through the same Jesus Christ our Lord.

FOR GROWTH IN GRACE, AND FINAL CONSUMMATION.

DEFEND me, O Lord, Thy servant, with Thy heavenly grace, that I may continue Thine for ever, and daily increase in Thy Holy Spirit more and more, until I come to Thy Heavenly kingdom, through Jesus Christ our Lord.

AN OCCASIONAL PRAYER FOR A FAMILY.

We humbly beseech Thee, O Lord our God, to look down with compassion upon this Thy family; who have once more met to implore Thy mercy and protection, and to offer to Thee the homage of our sinful hearts. We know, O Lord, that we are not worthy to approach Thee, who art of purer eyes than to behold iniquity; but we presume on the merits of our Blessed Redeemer, who has opened to us the gate of mercy and of pardon, to ask of Thee in His name both the remission of our sins, and the blessing of Thy providence upon our future endeavours. O Lord, we have sinned: we beseech Thee, pardon us. The remembrance of our transgressions is painful to our feelings; and we hope that Thou wilt accept the atonement of our Redeemer, and restore us to that favour

which our guilt has forfeited. And feeling our incompetency without Thy aid to walk in the ways of truth and innocence, we beseech Thee, O Lord, to send Thy Holy Spirit into our hearts, that He may guide us in the paths of peace and holiness. And grant, O Lord, that the fruits of Thy Holy Spirit may appear in every part of our future lives; that we may have some intimation of our acceptance with Thee, and know what manner of spirit we are of. Put away from us all bitterness, strife, and envying; all pride and selfishness; all deceit and falsehood. Let love, and harmony, and truth, and charity, reign for ever in our bosoms; that we may acquire some foretaste of Thy Heavenly kingdom, and that Thy will may be done on earth as it is done in Heaven. O Lord, if it shall please Thee to receive us there, when Thou hast taken us from this world of peril, we hope to behold Thy glorious presence, and to enjoy a continual communication with Thee. Enable us, O Lord, so to behold Thee now with the

eye of faith, that we may feel ourselves to be always in Thy presence; that we may place our affections upon Thee, as if we actually beheld Thy glory: that we may thereby acquire such perfection in holiness, such purity of heart, and such sweetness of affection, that whenever Thou seest good to call us hence, we may be fit to be received into Thy Heavenly kingdom.

Be pleased, O Lord, to accept our thanks for the manifold blessings and mercies which we daily receive from Thee: not only for our creation and preservation, and that still more wonderful and impressive instance of Thy love in redeeming us by the sufferings of Thy Co-eternal Son; but for all the comforts and conveniences which Thou so plentifully bestowest upon us, whilst so large a portion of mankind are suffering from hunger and nakedness, or eating in the bitterness of their souls the bread of sorrow and of misery. Grant, O Lord, that the sense of Thy goodness towards us may make us kind and compas-

sionate to our fellow-creatures. Teach us to consider them all as our brethren; to sympathise with their afflictions, and relieve their sufferings. And grant that we may all so profit by Thy dispensations towards us, whether they are those of joy or sorrow, that we may at length be purified from our manifold corruptions, and receive the accomplishment of our purchased salvation by participating in the glories of Thy eternal kingdom.

Our Father, &c.

Note to Page 5.

THE object of these passages was not to condemn the moderate enjoyment of any of the blessings which God has bestowed upon us: but to point out the danger of worldly prosperity; and to caution us against seeking it with too much zeal, or using it with too much freedom.—"How hardly shall they that have riches (says Our Saviour elsewhere) "enter into the kingdom of "Heaven!" And again, "to whomsoever much is "given, of him shall much be required." Such declarations as these should make us view the superfluities of life with an eye of jealousy rather than of desire: and remind us, that by increasing our portion of worldly enjoyments beyond the demands of our station, we at the same time increase our responsibility and our danger, and in all probability our sorrows also.

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